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ANNUAL REPORT
OF THE
GOVERNOR OF
THE PANAMA CANAL
FOR THE
FISCAL YEAR
ENDED JUNE 30
1920



386
P487

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

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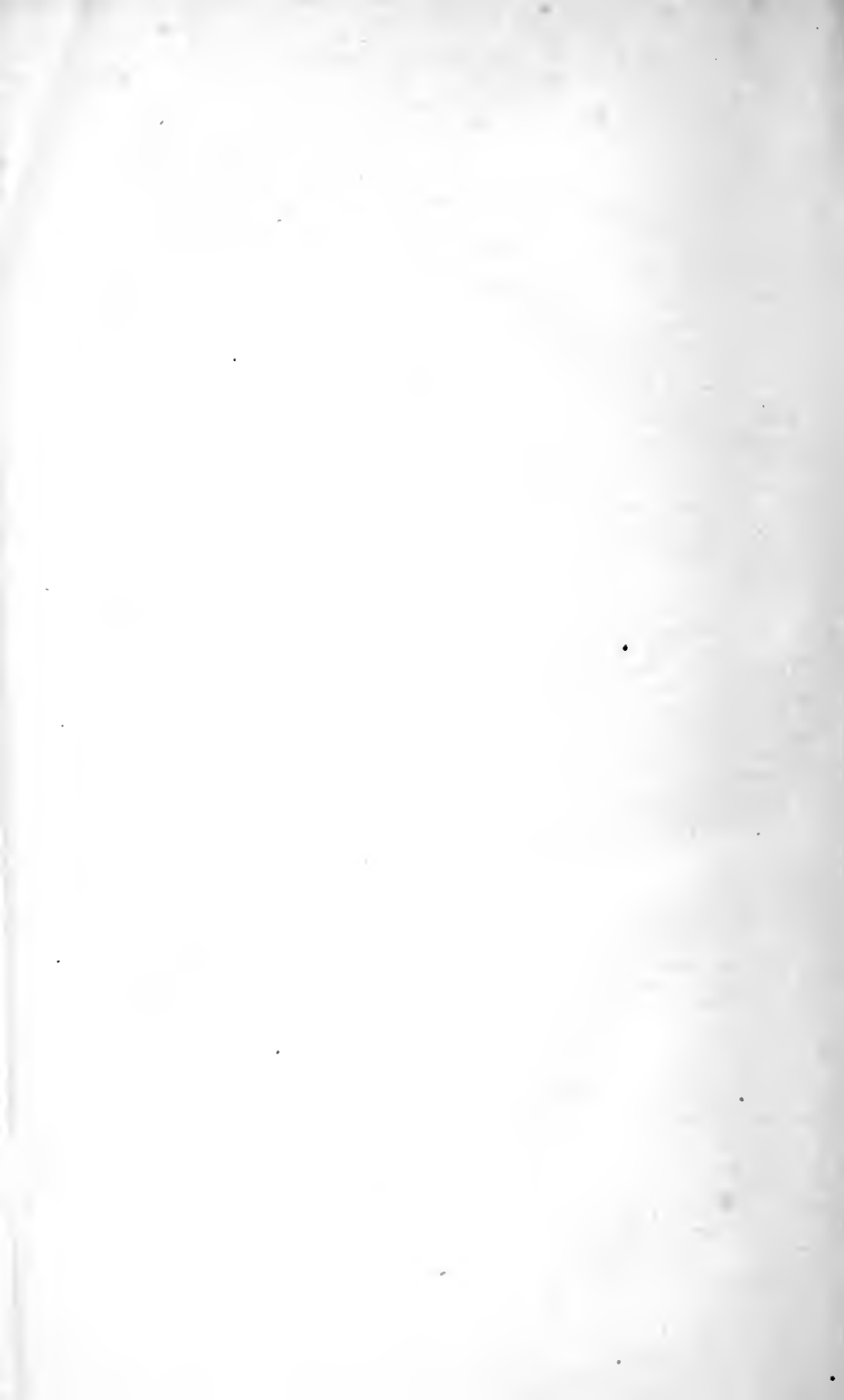
(Report of the superintendent, mechanical division.)

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(Report of the executive secretary.)

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ANNUAL REPORT OF THE GOVERNOR OF THE PANAMA CANAL.

THE PANAMA CANAL,
OFFICE OF THE GOVERNOR,
Balboa Heights, Canal Zone, September 23, 1920.

SIR: I have the honor to submit the annual report covering the construction, operation, maintenance, and sanitation of The Panama Canal for the fiscal year ended June 30, 1920.

The Canal was informally opened to traffic in August, 1914. On July 12, 1920, the President issued the following proclamation formally announcing the completion of the Canal and declaring it open to commerce:

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA.

A PROCLAMATION.

Whereas section 4 of the act of Congress entitled "An act to provide for the opening, maintenance, protection, and operation of The Panama Canal, and the sanitation and government of the Canal Zone," approved August 24, 1912 (37 Stat. L., 561), and known as the Panama Canal act, provides that upon the completion of The Panama Canal the President shall cause it to be officially and formally opened for use and operation; and

Whereas the canal is completed and is open for commerce:

Now, therefore, I, Woodrow Wilson, President of the United States of America, acting under the authority of the Panama Canal act, do hereby declare and proclaim the official and formal opening of The Panama Canal for use and operation in conformity with the laws of the United States.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

Done in the District of Columbia this 12th day of July, in the year of our Lord one thousand nine hundred and twenty, and of the independence of the United States of America the one hundred and forty-fifth.

[SEAL.]

WOODROW WILSON.

By the President:

NORMAN H. DAVIS,
Acting Secretary of State.

This formality was necessary in order to comply with the requirements of the Panama Canal act.

During the six years of operation there has been a marked increase in traffic through the Canal notwithstanding the fact that the World War has everywhere prevented the normal development of ocean-going commerce. After the entry of the United States into the war there was a decrease in commercial traffic, due to the diversion of certain lines of ships to trans-Atlantic service, which was more than offset by the increase in traffic growing out of the war, chiefly on account of the development of the nitrate trade with the Pacific coast of South America.

The number of commercial transits, the amount received from tolls and other collections, and the current expenses of maintenance and operation for the several fiscal years are shown in the following table:

Fiscal year.	Number of commercial transits.	Tolls and other revenues.	Current expenses of operation and maintenance.
1915.....	1,072	\$4,343,383.69	\$4,123,128.09
1916.....	760	2,558,542.38	6,909,750.15
1917.....	1,806	5,808,398.70	6,788,047.60
1918.....	2,068	6,411,843.28	5,920,342.94
1919.....	2,028	6,354,016.98	6,112,194.77
1920.....	2,478	8,935,871.57	6,548,272.43

For the same period the number of Canal transits by Government vessels exempted from tolls and the total tonnage of cargo carried were as follows for each fiscal year:

Fiscal year.	Number of vessels.	Cargo.	Fiscal year.	Number of vessels.	Cargo.
		<i>Tons.</i>			<i>Tons.</i>
1915.....	16	43,647	1918.....	112	36,743
1916.....	43	76,675	1919.....	179	93,641
1917.....	109	147,405	1920.....	267	351,332

Included in the above are 172 merchant ships carrying cargo for the Government.

The revenue of the Canal exceeded the current expense for its operation and maintenance by \$2,387,599.14 for the fiscal year 1920, and the total current expense of operation and maintenance for the six-year period since 1914 exceeded the total revenues by the amount of \$2,231,091.61. This excess will be more than overcome by the revenues of 1921. The year in which the expenses exceeded the revenues in the greatest amount was 1916, during which traffic was suspended for six months on account of the great slides at Culebra, and the expenses were increased by the cost of removing them.

The Canal in its present state represents a capital expenditure by the United States of \$366,650,000, exclusive of expenditures for its military and naval defense. The investment, from one point of view, may be regarded as having been made and justified in the creation of an invaluable element of national defense. If this be true, the Canal has an additional value in rendering useful service in time of peace, and in returning to the Federal Treasury revenue more than sufficient to defray the expense of its operation and maintenance. It is capable of doing more than this; and it is not an idle prediction to state that with proper management directed along the lines of a large business enterprise, it will within a reasonable period of normal world conditions earn an actual profit on the cost. From an analysis made under reasonable assumptions as to amortization, depreciation, obsolescence, and interest, it is estimated that with an annual revenue of three times that of 1920 the Canal will make a financial return on the investment. The time required to produce this result will be affected by any changes in legislation affecting charges for tolls. In the meantime the Canal is performing

an important commercial service in a promising field by stimulating trade with the Orient and with the west coast of South America. Over 25 per cent of the cargo handled through the Canal since its opening to the end of the fiscal year 1920 was in transit between the United States and South America, and 14½ per cent was between the Atlantic coast of the United States and the Orient. Among nations the chief users of the Canal are the United States and Great Britain. The number of vessels passed each year for these nations and for all other nations was as follows:

Fiscal year.	United States.	Great Britain.	All other nations.	Fiscal year.	United States.	Great Britain.	All other nations.
1915.....	470	465	153	1918.....	628	699	803
1916.....	238	353	191	1919.....	786	602	637
1917.....	464	780	632	1920.....	1,129	753	596

By authority of the Panama Canal act, stores of coal, fuel oil, ship chandlery, groceries, meats, and miscellaneous supplies are maintained by The Panama Canal and Panama Railroad to meet the requirements of ships that use the Canal, and facilities for repairs to ships are provided at the two terminals, including the dry dock at Balboa, capable of receiving any ship that can pass through the locks. These auxiliaries have been largely utilized and are of great value in carrying out the policy of making the Canal attractive in all of the incidental services that are considered by shipping interests in routing their vessels. It has not been the purpose to make large profits on these activities, but rather to regulate the charges so as safely to cover the cost. The receipts from these miscellaneous services to shipping during the year were as follows:

Coal.....	\$6,032,578.74
Water.....	55,412.64
Oil, groceries, and miscellaneous supplies.....	1,274,556.18
Mechanical repairs to ships.....	3,863,933.00

With the growing traffic, it will be necessary to expand these auxiliary facilities in the near future. The old dry dock and shops at Cristóbal, inherited from the French, and utilized during construction days for repairs to Canal equipment, are notably inadequate to meet the present requirements of commercial steamers. These developments will require appropriations in addition to the amount of current expenditures, but the earnings of the Canal will be correspondingly increased and the amount expended will be returned from the revenues derived. If the developments are permitted to lag behind the increasing traffic, the Canal will not be in position to handle all of the business offered.

The problems confronting the head of the local administration of Canal affairs are those arising from (1) the maintenance of the Canal, the Panama Railroad and other auxiliaries, involving the practice of civil engineering in all its branches, including sanitation; (2) the operation of the Canal, requiring technical knowledge of all of the engineering features of the Canal and of its navigation, and of the conduct of a great business enterprise of unusually varied ramifications; and (3) the government of the Canal Zone, involving the administration of civil laws affecting persons living within the limits of the

Canal Zone or entering upon it. The responsibility of the Governor in all of these matters is complete; his authority is also complete, as determined by the organic act and by the Executive orders of the President issued thereunder. The duties, responsibilities, and authorities of the Governor are civil in character and have no relation to the preparation for the defense of the Canal in time of war. He continues his functions during war, except that within the discretion of the President, under authority of the organic act, the commanding officer of the military forces on the Canal Zone may be given entire control during a state of war, in which case the Governor performs his duties under the direction of the military commander. In every branch of his work the Governor has the responsibility of maintaining an efficient force of employees and of settling locally, so far as possible, all issues raised by them concerning compensation, conditions of employment, and other matters. A liberal, but, in my judgment, a reasonable policy, has been followed in adjusting these issues. The organic act of the Canal fixes a maximum limit of pay for its employees for services similar to those of Government employees in continental United States. Many employees perform duties for which there is no parallel in other Government service, and their compensation is deduced from prevailing commercial rates in the United States for similar work. In general, the allowable increase of 25 per cent above United States rates is applied to American employees, adjustments being made in some cases for purposes of coordination among positions of equivalent responsibility in our organization. The Canal schedules of pay have therefore followed the increases that have occurred in the United States. In the case of the alien labor force, composed almost altogether of West Indians, increases in wages have kept pace with increases in living costs, as compared with the standards of 1914. A permanent board of heads of departments and divisions is convened every three months to make thorough investigation of changes in cost of living to these employees and to recommend appropriate changes in wages to meet them. There has been a large surplus on the Isthmus of this class of help, but during the year 1920 some emigration has occurred to Cuba and the United States.

General industrial conditions on the Canal are good. There has been some unrest, but less than elsewhere. Care has been taken to avoid arbitrary and unreasonable action in adjusting elements of discontent, with results that have been generally satisfactory. Representation has been allowed to employees on boards appointed for making recommendations concerning rates of pay and working conditions. It has been my experience that among American employees decisions based upon a consideration of both sides of the questions at issue have been acceptable to them, and that, in general, they take an active interest in the Canal and its welfare and have a commendable feeling of pride in it.

The turnover in force of Americans during the year was 33 per cent. Some of it is attributable to resignations on account of opportunities for betterment elsewhere, but most of it to the fact that the American workman does not wish to make his permanent home in the Tropics, and while here feels out of touch with possibilities of business advancement at home. I do not advise taking away the privileges now enjoyed by our American employees, but believe that the local situa-

tion should be allowed to work itself out under conditions as at present established and along the lines of comparison with industrial conditions in the United States.

ORGANIZATION.

The heads of departments and divisions remain as reported last year, with the following exceptions:

By orders from the Navy Department, Capt. L. R. Sargent, United States Navy, marine superintendent, was relieved from duty with the Canal on April 15, and Capt. E. P. Jessop, United States Navy, was detailed for appointment to the position.

Mr. T. L. Clear, who resigned the position of collector on September 20, 1918, to accept a commission in the Inspector General's Department of the United States Army, returned to his former position with the Canal on September 6, 1919.

Mr. J. H. McLean, paymaster, resigned on November 15, 1919, and Mr. R. W. Glaw, assistant paymaster, was promoted to fill the vacancy on January 24, 1920.

DEPARTMENT OF OPERATION AND MAINTENANCE.

BUILDING DIVISION.

This division remained in the charge of Mr. T. C. Morris, resident engineer, under the supervision of the engineer of maintenance. On account of lack of appropriation no large building projects were in progress for the Canal, and the chief operations of the building division comprised the construction of two Army posts, one at New Gatun and one at Miraflores, from Army appropriations which were allotted by the Secretary of War to the Governor for expenditure. The total amount appropriated for the projects was \$4,986,849, of which \$2,851,600 for buildings were allotted to the building division.

A general description of the buildings constructed was contained in the report of last year. Unavoidable delays were experienced in the progress of the work on account of delays in filling requisitions for material and for skilled mechanics. Under a requirement of the act appropriating the funds no material, supplies, or equipment could be purchased until it was determined whether or not they could be furnished from available surplus stores of the War Department. In filling our requisitions it was necessary for the general purchasing officer in Washington to communicate with the various surplus stores of the construction divisions of the Army and attempt to purchase all available material from these stores. In some instances certain materials were available when the inquiries were made but had been otherwise disposed of when about to be contracted for. In such instances it was necessary to purchase the needed material in the ordinary way from commercial firms. Unprecedented delays occurred also on account of difficulties in transporting materials to the seaboard, congestion in the harbors in the United States, and delays to shipping on account of labor difficulties.

On June 30, 1920, the state of completion at Fort Clayton (Miraflores) was as follows: All buildings 100 per cent except headquarters, which was 85 per cent complete; one battalion barracks, 85 per cent

complete; one battalion barracks, 70 per cent complete; and at Fort Davis (New Gatun), all buildings were 100 per cent complete except one 2-family captain's set, 84 per cent complete; one 2-family set, 50 per cent; one 4-family lieutenant's set, 90 per cent; and one 4-family lieutenant's set, 80 per cent complete; headquarters building, 95 per cent complete; one battalion barracks 70 per cent, and one battalion barracks 60 per cent complete.

At the naval submarine base and air station, work was continued on projects for which allotments have been made by the Navy Department. Total expenditures during the year for the submarine base were \$147,317, and for the naval air station \$91,919.

Work at the Army aviation base under an allotment from Army appropriations was continued; total expenditures during the year being \$66,954.

At Fort Sherman new work authorized under an allotment from Army appropriations for barracks and quarters was completed at a total expenditure of \$125,715.10. A new wharf was completed at a cost of \$25,501.08.

At the new silver townsite at Mount Hope work was begun on the construction of thirty-nine 12-family frame quarters and ten 32-room frame bachelor quarters. At the end of the year the project was 54 per cent complete. A commissary building authorized for this community was under construction and was 75 per cent complete at the end of the year.

This division was placed in charge of the erection of a 100-foot lighthouse at the channel end of the east breakwater, Cristobal Harbor. Contract was awarded for the superstructure on October 8, 1919, at a price of \$6,500 delivered at Colon. The contractor's drawings were received on February 3, 1920, giving the dimensions of the base of the tower and sufficient data for computing the loads on the base. The foundation consists of 23 feet 7 inches square reinforced concrete deck design, supported by 12 steel pipe piles, 3 at each corner, driven to rock. After driving the piles were filled with concrete. The construction of the foundation was completed on June 22, and the erection of the superstructure will proceed upon the arrival of its component parts on the Isthmus.

From funds made available by congressional appropriation, work was begun on the construction of a 60-ton daily capacity garbage incinerator for the Cristobal-Colon district. On July 1 the building was practically complete. The equipment was installed and the work remaining to be done consisted of placing fire brick lining in the combustion chambers and breechings. The building is of reinforced concrete construction, with tile roof, two stories high, and 37 feet 3 inches by 101 feet 3 inches in horizontal dimensions. On the first floor are two 30-ton incinerating units with their accessories. The second floor is of reinforced concrete, designed to support a live load of 200 pounds per square foot, and will be used for the receiving and distribution of garbage for incineration. The garbage will be delivered on motor trucks with removable steel bodies of 2½ yards capacity. An overhead electric crane will lift the bodies from the trucks and dump them directly into the incinerator hopper or in the proper place on the floor until the furnace conditions warrant charging. The estimated cost of the project is \$113,000.

A combined mechanical shop and storehouse was authorized for construction in the immediate vicinity of the Cristobal docks. In the shop will be handled the increasing amount of minor repairs to commercial ships and others lying at the docks, and the storehouse will be used for ships' stores where they will be readily accessible, as required, for sale to ships at the docks. The shops area is 76 by 113 feet, and the storeroom 76 by 125 feet; the end of the building designed for a storehouse will be two stories high. The estimated cost of the building is \$90,000 and on July 1, 1920, it was 52 per cent complete.

The old Panama Railroad stables in Colon, constructed in 1908, were demolished for sanitary reasons, and a new building was authorized in a section of Colon set apart for such purposes, at an estimated cost of \$142,000. Work proceeded on the construction of the new stables during the year and the buildings were 84 per cent complete at the end of the year.

The old Royal Mail pier at Colon was demolished by virtue of a sanitary regulation of November 11, 1913, which required the demolition of all nonrat-proof piers by January 1, 1919. The property was acquired by the Panama Railroad Company, and on the iron substructure, which remained intact, a new fireproof and rat-proof structure was built 60 by 400 feet for the accommodation of small coastwise and native craft. The reinforced concrete floor slab is designed for a live load of 175 pounds per square foot over the entire structure, covered with a roof built of material salvaged from the old Panama Railroad Pier No. 2. Water lines were installed for fire protection and for water supply to ships. The work was completed at a total cost of \$38,247.70.

Under work request from the supply department construction was begun of two reinforced concrete oil tanks, 55,000 barrels capacity each, one at Mount Hope and one at La Boca. The estimated cost of the tanks is \$55,000 each. On July 1, 1920, the Mount Hope tank was 98 per cent complete and the La Boca tank 60 per cent complete.

In addition to the above, the building division performed various minor items of work for the Canal; and for individuals and companies the following work was performed: The construction of a community house for the National Catholic War Council, at Balboa, at an estimated cost of \$85,000, was in progress; an office building and quarters for the Royal Mail Steam Packet Company, at Cristobal, was under construction at an estimated cost of \$275,000; and bachelor quarters and an office building for the Central and South American Cables Company was completed.

The operations of the building division are described in further detail in Appendix A.

LOCKS OPERATION AND MAINTENANCE.

On July 25, 1919, the largest American ships that have transited the canal were passed through the locks; they were the dreadnaughts *New Mexico* and *Mississippi*, each of 32,000 tons displacement, 624 feet long and 97 feet 4½ inches beam. As the locks are 110 feet wide, there was in each case a clearance of 6 feet 3¼ inches on either side,

with the vessel centered in the locks. No difficulties were experienced during the passage.

The British cruiser *Renown*, which passed through the Canal on March 30, 1920, is the largest ship to have transited the Canal to date, although her beam is 6 feet less than that of the *New Mexico* and *Mississippi*. She has a length of 795 feet and a displacement of 33,379 tons.

There was a total of 8,149 lockages during the year, of which 2,559 were at Gatun, 2,859 at Pedro Miguel, and 2,731 at Miraflores. A total of 2,534 commercial vessels were locked through at Gatun, 2,527 at Pedro Miguel, and 2,528 at Miraflores. Six hundred and fourteen vessels of all descriptions, pertaining to the Canal and Army and Navy, for which no tolls were paid, passed through Gatun locks; 1,003 through Pedro Miguel locks, and 978 through Miraflores locks.

For purposes of inspection and repair, locks were out of commission during the year as follows: At Miraflores, east chamber, from December 12, to January 31; west chamber, from February 2, to February 7; at Pedro Miguel, west chamber, from February 12 to March 27. During these periods the rising stem valves at Miraflores and Pedro Miguel locks were removed and completely overhauled. Considerable evidence of the action of the teredo was found in the submerged hardwood valve fittings and gate sills, requiring replacement of the parts affected. The wearing pads and roller trains of the rising stem valves were found to be worn sufficiently to require their replacement at their next period of overhauling. The maintenance of the protective coating of the submerged portion of the lock gates was continued. None of the chambers of the Gatun locks were unwatered during the year, and with the exception of the overhauling of the 12 intermediate valves and 24 roller trains nothing but the usual work was done.

The work of the operation and maintenance of the locks is described in detail in the report of the engineer of maintenance, Appendix A.

ELECTRICAL DIVISION.

This division is charged with the maintenance and operation of the electric generating stations, substations, transmission lines, and power distributing systems; maintenance of the lighting systems of the Canal Zone; maintenance of telephones and telegraphs, fire alarm and railway signal systems, and railway interlocking plant, and installation and maintenance of all new electrical equipment required by the Canal, the railroad, the Army and Navy posts, and such commercial vessels as require electrical work while transiting the Canal. The division remains in the charge of Mr. Walter L. Hersh as electrical engineer.

The total expenditures of the division for the year were \$1,700,000, of which 46 per cent was for work and current for other departments of the Canal, 24 per cent for work and power for the railroad, 10 per cent for work performed for outside interests, 9 per cent for improvements in the power system, and 6 per cent for exterior electrical work at the new Army posts at Fort Clayton and Fort Davis; 1½ per cent for work for other departments of the Government, and the balance of 3½ per cent covers stock of materials, equipment purchased, and work in progress awaiting completion and rendering of bills.

The major equipments of the power system remained unchanged during the year. Due to the failure of a 2,200-6,600-volt auto transformer of unit No. 2, Gatun hydroelectric station, a complete set of new coils for this transformer was ordered. Pending the delivery of the new coils No. 2 generator has been placed directly on the 2,200-volt service and is operating at about three-quarters capacity.

At the Cristobal substation two 2,200-volt feeder equipments were installed, one as a distribution feeder to the new silver townsite at Mount Hope and the other to relieve the existing feeders to the Cristobal docks to provide power for the new small machine repair shop at the docks.

At Gatun substation a new 300 KVA 60,000-volt testing transformer was installed for applying high potential tests to the transmission line. A 30-ton motor-operated chain hoist was installed preparatory to the handling and installing of an 8,400 KVA 44,000-6,600-volt transformer on requisition for this substation.

The average combined generator output of the power system for the year was 5,382,750 KWH per month, as compared with 4,725,637 KWH per month last year. A monthly average of 4,608,341 KWH was transmitted and distributed to all power consumers, with a monthly average of 3,955,607 KWH last year.

On account of the abnormal dry season, extending until the middle of May, it was found advisable to conserve the water supply stored in Gatun Lake by relieving the hydroelectric station of a load ranging from 3,000 to 4,000 KW. During this period this load was carried by the steam power plant at Miraflores, which generated 8,234,380 KWH. During the remaining nine months Miraflores plant was maintained on the usual basis of stand-by service.

There were from all causes 11 interruptions in the service of the transmission line, as compared with 49 last year. There was only 1 interruption chargeable to insulator failure, as compared with 32 last year. This improvement is attributed to the additional disk installed to all insulator strings of the transmission line, as mentioned in the report of last year.

The average cost of electric power distributed for the year was 9.421 mills per KWH, and the average cost of distributed lighting current, including lamp renewals, was 13.277 mills per KWH. The corresponding figures for last year were 8.097 mills for power and 12.963 mills for lighting.

During the year 999 telephones were installed and 636 removed, leaving a total of 3,330 telephones in service on June 30, 1920, a net increase of 363 telephones in the year. The average number of telephone calls during the eight-hour business day was 28,900, as compared with 22,630 for last year. A total of 15,114 feet of lead-covered, paper-insulated telephone cable of all sizes was installed, resulting in a total installation of 642,448 feet of telephone cable in service on June 30, 1920.

There were no failures in alarm apparatus during the year, and 27 alarms were turned in. Two new fire-alarm boxes were installed on Pier No. 6, Cristobal. There were no material changes in the railway signal installation during the year. There were 2,262,937 registered arm movements, with 149 failures, as compared with 2,084,908 arm movements and 97 failures during last year.

At the electrical repair shop 307 armatures, motors, and generators were rewound; 131 transformers and miscellaneous coils were renewed; 156 magnetos and fan motors were rewound or repaired; 62 electrical appliances were repaired; 148 switchboards and panels were manufactured, and 180 miscellaneous other repair jobs were done. The forces of the electrical division handled 361 jobs of marine electrical work on ships at Cristobal and 416 at Balboa. The more important items of this work included the complete rewiring, overhauling, or additions to the electrical installations aboard the steamships *Cristobal*, *Acajutla*, *Ansaldo*, *San Giorgio*, *Salaverry*, *Paita*, *Circassian Prince*, *Azov*, *Ardmore*, and the Peruvian cruiser *Lima*.

For further details of the work of the electrical division see report of the electrical engineer, Appendix A.

MUNICIPAL DIVISION.

The work of this division continued under the charge of Mr. D. E. Wright, as municipal engineer, under the supervision of the engineer of maintenance. The work performed included the operation and maintenance of water reservoirs, pumping stations, filtration plants, and the maintenance and repair of municipal improvements in the Canal Zone and in the cities of Panama and Colon.

Miscellaneous municipal construction work for the Canal, the railroad, the Army and Navy, and for individuals and companies, included the following principal items: Necessary surveys for new townsite projects, including the layout and design for water, sewers, streets, and sidewalks; the maintenance of all roads, water-pumping stations, purification plants and pipe lines, and such municipal construction work as was required within the Canal Zone and cities of Panama and Colon. The principal items of new construction work included municipal engineering work for the new Army posts at Fort Clayton and Fort Davis; the development and placing in municipal order of the extension of the city of Colon, providing additional 99 building lots for residential purposes for individual residents of Colon and for Canal employees; the new town of Mount Hope for occupation by silver employees of the Panama Railroad at the docks and coaling stations; the construction of a concrete road with an asphalt wearing surface from the lumber shed in Balboa to Diablo Hill; the resurfacing and oiling of the Paraiso-Gamboia macadam road; street extensions for new buildings of the Army posts at Fort Sherman, with necessary water and sewer connections; the demolition of the Calidonia bridge over the Panama Railroad tracks in Panama and constructing a grade crossing to replace it; the repairing of roads in Fort Amador and Corozal; miscellaneous work for the United States Navy at Coco Solo, consisting of construction of sea wall, sanitary ditches, baseball park, concrete sidewalks, etc.; the development of block 54, Colon, as a warehouse site; construction of concrete road from the new cold-storage plant to the Margarita-Mount Hope Road; the extension of the concrete road to Pier No. 6; and a large amount of miscellaneous work for The Panama Canal, the Panama Railroad, and various business concerns of Panama and Colon. The amounts expended on this work are as follows: Army post, Fort Clayton, \$355,829.12; Army post, Fort Davis, \$329,786.05; silver townsite, Mount Hope, \$115,788.62; concrete road

Balboa to Diablo Hill, \$34,452.44; resurfacing Paraiso-Gamboa road, \$22,713.22; roads, streets, sidewalks, etc., Fort Sherman, \$9,881.25; Calidonia bridge crossing, \$36,594.87; miscellaneous municipal work for United States Army, \$39,659.61; miscellaneous municipal work for United States Navy, \$38,446.18; development of block 54 in Colon, \$38,537.43; road from cold-storage plant, Mount Hope, \$39,150.11; extension of road to Pier 6, \$12,779.63; miscellaneous municipal work for the Panama Canal departments and Panama Railroad, \$159,893.22; outsiders, \$20,232.43; municipal engineering work, New Cristobal, \$91,488.44; and municipal work between Seventh and Ninth and G and K Streets, Colon, \$115,685.67.

The supplying of water and the maintenance of sewer systems and streets in the cities of Panama and Colon was continued. The total expenditures in these two cities for routine maintenance work was \$184,453.92. Work was continued on enlargement of storm sewer drains in the city of Panama, \$112,177.84 being spent.

The total number of gallons of water pumped at the various pumping stations was as follows: Gamboa, 3,895,630,000; Miraflores, 423,790,000; Balboa, 2,790,202,000; Paraiso, 74,640,000; Cucaracha, 176,513,000; Mount Hope, 2,157,686,000; Agua Clara, 427,714,000; Frijoles, 11,620,000; and Monte Lirio, 3,264,000. The divisional cost of water delivered in the several districts was as follows per 1,000 gallons: Ancon-Balboa, \$0.07; Miraflores, \$0.06; Pedro Miguel, \$0.07; Paraiso, \$0.07; Gamboa, \$0.08; Gatun, \$0.14; and Cristobal, \$0.07. These costs include filtration, analysis, and treatment. The sales of water to vessels were as follows: Cristobal, 2,215 vessels, 110,825,282 gallons; Balboa, 1,438 vessels, 35,289,250 gallons. The water consumption in the city of Panama for the year was 1,026,440,000 gallons, and in Colon the consumption was 625,371,800 gallons.

For further details of municipal engineering work see report of the municipal engineer, Appendix A.

METEOROLOGY AND HYDROGRAPHY.

The section continued in the charge of Mr. R. Z. Kirkpatrick, chief hydrographer, reporting to the engineer of maintenance. All of the meteorological stations as reported for last year have been continued in operation and additional stations were established as follows: A standard rain gauge was installed at La Palma in December, 1919, operated by the naval radio station at that point; at Divala, Province of Chiriqui; Mariato, Province of Veraguas; and at Mandinga Bay, Province of Colon, all in the Republic of Panama, during the dry season of 1920. These stations are not operated at the expense of The Panama Canal.

For the calendar year 1919 the rainfall was below normal at all stations in the Canal Zone and vicinity, except Cape Mala, Taboga, Chilibrillo, and Bocas del Toro. The greatest deficiency was 32.14 at Brazos Brook. At most stations October was the month of heaviest rainfall and March the month of lightest rainfall. The average annual rainfall in the Pacific section was 63.39 inches; in the Central section, 79.11 inches; and in the Atlantic section 109.89 inches. The greatest precipitation recorded in any one day was 9.09 inches at Porto Bello on August 23, 1919. The four months dry season rainfall for the fiscal year 1920 is the lowest of record since American occupation

in 1904, and the dry season conditions were prolonged until the middle of May, a full month longer than usual. The rainfall for the first six months of the calendar year 1920 was below normal throughout the Canal Zone and vicinity, the difference being most pronounced in the Atlantic section.

The average air temperature for the year was above normal. For the calendar year 1919 the maximum temperature recorded was 94° F., which occurred at Balboa Heights on February 6 and at Gamboa on April 11, and the minimum temperature recorded was 61° F., at Alhajuela on March 22.

The annual wind movement in the Canal Zone for the calendar year 1919 was above normal; northwest, north, and northeast winds prevailed at all stations. The maximum wind velocity recorded for the year was 50 miles per hour, at Gamboa on September 26, and at Gatun on June 17. During the calendar year 1919 the evaporation over the surface of Gatun Lake was below the average of eight years. During the first six months of 1920 the evaporation was above normal, due to the unusual length and intensity of the dry season. The usual conditions of frequent night and early morning foginess prevailed at the interior stations during the rainy season, and as usual all fogs observed were dissipated by 8.30 a. m.

There were 33 seismic disturbances during the fiscal year 1920; all were of moderate intensity and no damage was done to Canal structures.

For the calendar year 1919 the total yield of the Gatun Lake watershed was 17 per cent below normal, the average yield being 5,225 c. f. s., as compared with a nine-year average of 6,267 c. f. s. The maximum monthly average yield was 1,053 c. f. s. in October, and the minimum was 952 c. f. s. in March. The actual total yield for the calendar year 1919 was 164.79 billion cubic feet, of which 36 per cent was run-off above Alhajuela, 44 per cent from land area below Alhajuela, and 20 per cent direct rainfall on Gatun Lake surface. Of the total yields, 14 per cent, or 22.108 billion cubic feet, were lost by evaporation from the lake surface; 11 per cent, or 18.246 billion cubic feet, were consumed in lockages; 28 per cent, or 46.34 billion cubic feet, were consumed at the hydroelectric plant at Gatun; 46 per cent, or 76.044 billion cubic feet, were discharged over the spillways, and 1 per cent, or 1.89 billion cubic feet, were consumed at the water pumping stations, in leakages, and other losses.

At the beginning, on December 16, 1919, of the 1919-20 dry season, Gatun Lake was at its maximum stage of 87 feet. On account of the abnormal intensity and length of this dry season and of the increased consumption of water due to increased traffic in the Canal, the lake on May 28, 1920, soon after the close of the dry season, had fallen to elevation 81.77. On account of the rate of fall of the lake, and of the condition of Cucaracha slide, it was determined to conserve water by reducing the output of the hydroelectric generating plant at Gatun by 50 per cent and to supplement the necessary power by the operation of the Miraflores steam plant. This was done on March 3, and continued to June 3, by which date the lake had begun to rise at a sufficient rate to justify the full operation of the Gatun hydroelectric plant. If the hydroelectric plant had continued at its

normal output without interruption, the lake would have fallen to elevation 80.55.

Nothing in the results following the abnormal dry season of this year has indicated the necessity for many years to come, if at all, of the creation of an additional reservoir by the construction of the Alhajuela dam. With the traffic developed to the capacity of the Canal and with the hydroelectric plant at Gatun operated at its maximum ultimate capacity, it will always be necessary to waste water over the spillways during the rainy season. During a part of abnormal dry seasons it will probably be necessary to conserve water, as was done from March to June of this year, by reducing the output of the hydroelectric plant at Gatun and by generating the deficiency in the operation of the steam plant at Miraflores. As the other work of the surveys office permits, additional surveys are being made of the upper Chagres Valley for the purpose of accumulating data for estimating the volume of water that may be impounded above Alhajuela, if in the future it becomes apparent that the additional reservoir is advantageous.

Reference is made to Appendix A for other details.

SECTION OF SURVEYS.

Mr. O. E. Malsbury continued as assistant engineer in charge of this section, reporting to the engineer of maintenance. The section conducted all surveys for the land office of the Canal and Panama Railroad and maintained the establishment of Canal Zone monuments, triangulation stations, and bench marks. It also made surveys and prepared maps for the Army and Navy and for the joint land commission, as required. Corner and grade stakes were set on 43 lots in the city of Colon, on 1 lot in Cristobal, and on block 23 in the city of Panama.

Observation at points on Gatun dam and of the south approach walls at Gatun were continued, indicating normal conditions. The entire 5-mile limit line of the east side of the Canal Zone was cleared and marked with 168 extra monuments. On the west side of the Canal the 5-mile limit line between the Canal Zone and the Republic of Panama was cleared and marked with 10 extra monuments.

A new triangulation station was established in the vicinity of Fort Clayton Military Reservation, and four new stations were established in the vicinity of upper Chagres River on which to tie the survey of the Alhajuela Basin. Various surveys were made for the supply department, health department, and electrical division, as described in the appendix. Boundary lines of military and naval reservations in the Canal Zone were established and maintained.

For further details see Appendix A.

OFFICE ENGINEER.

This work continued in the charge of Mr. C. J. Embree, under the supervision of the engineer of maintenance, and included the engineering, architectural, and miscellaneous design work for all divisions of the Canal except the mechanical division.

There was a total of 685 working drawings issued, of which the most important were for the building division and electrical division.

The office issued during the year 224,670 square feet of blue prints, 19,653 square feet of white prints, and 8,715 square feet of brown prints, at an average cost of $1\frac{1}{8}$ cents per square foot.

DREDGING DIVISION.

This division continued in charge of Mr. J. M. Pratt, superintendent of dredging, under the direction of the engineer of maintenance. It was charged with the maintenance of the Canal prism and of the approach channels to the docks and coaling plants at the Canal entrances, and with the sand and gravel production from the bed of the Chagres River.

The total amount of material of all kinds excavated by the dredging plant was 4,750,686 cubic yards, at an average cost of $34\frac{1}{8}$ cents per cubic yard. Of the material excavated, 3,333,961 cubic yards were earth and 1,416,725 cubic yards were of rock. Except for 120,676 cubic yards of sand and gravel production, the cost just stated includes the transportation and dumping. For the sand and gravel production, costs include delivery alongside the gravel dock at Gamboa. A total of 3,711,810 cubic yards was removed from the limits of the Canal prism, distributed geographically as follows: From Atlantic Ocean to Gatun, 0; from Gatun to Gamboa, 7,400 cubic yards; from Gamboa to Pedro Miguel, 2,121,710 cubic yards; from Miraflores Lake, 0; and from Miraflores to Pacific Ocean, 1,582,700 cubic yards. Of these amounts all were chargeable to maintenance except 17,800 cubic yards chargeable to construction between Miraflores and the Pacific Ocean. Within the limits of the Canal prism there remained on June 30, 1920, to be removed 155,400 cubic yards chargeable to construction and 3,286,900 cubic yards chargeable to maintenance.

The large amount of dredging done in Gaillard Cut section was due to the renewed activity of Cucaracha slide, 77 per cent of the total yardage reported in this section having been removed from that obstruction. The slides at Culebra were quiescent throughout the year, except for a small movement of the East Culebra slide in the latter part of October, 1919, requiring the excavation of 272,000 cubic yards from October 16 to December 27.

In August, 1916, a movement in the old slide area at Cucaracha closed the Canal to traffic for a period of eight days. Equilibrium was restored after the removal of 1,054,757 cubic yards from the Canal prism and the excavation of a small basin in the bank of the Canal. Within the area of the disturbance, but not affected by it, was a high ledge of rock extending diagonally from a massive hard rock promontory, locally called "Purple rock," at the edge of the Canal, to Gold Hill, at a point 1,200 feet from the Canal. By its resistance this ledge retained and prevented the motion of the mass of material behind it. The first indication of new disturbance was a surface movement of the mass behind the rock ledge that began during the heavy rainfall of October, 1919, and which forced material over the ledge and into the Canal. This condition continued without serious results until February 21, 1920, when a large general movement occurred carrying huge masses of earth and rock into the Canal prism and obstructing the channel, except for small draft ships. The operations of the large dipper dredges accomplished the removal

of the obstructions at a sufficient rate to keep the Canal open to all traffic with the exception of occasional delays in February, March, and April. Twenty-seven ships were delayed an average of two days, the maximum delay to any ship being four days. By June 12, 1920, the channel had been restored to full dimensions and at the date of this report a basin has been created by excavating the broken bank throughout the full length of the slide and for an average width of 250 feet outside the limits of the Canal.

Between February 21, the date of the first obstruction, and September 1 a total of 1,890,800 cubic yards was removed by the dredges, at an average cost, including transportation and dumping of the dredged material, of 37½ cents per cubic yard.

When stability was secured after the movement of 1916, it was expected that no more serious difficulty would be experienced at Cucaracha, and this expectation was strengthened by three years of quiescence. The renewed activity was obviously due to the failure of the rock ledge referred to above, which finally yielded under the pressure of the material behind it and left that material free to move toward the Canal.

The slide at Cucaracha has always been free from one of the difficult features of the slides at Culebra, which closed the Canal in 1915-16. At the latter place the disturbance extended to a depth below the level of the bottom of the Canal and shoals were formed by the upheaval of the bottom. At Cucaracha the bottom has remained undisturbed, and we have had to handle only the material that actually moved from the banks. The present situation is that all obstructions have been removed, the motion is much retarded, and a new period of stability is approaching. For several months to come it may be necessary to operate a dredge to keep pace with the movement, but the creation of a basin permits the work to be done outside the limits of the Canal prism, and therefore without interference with traffic. As the failure of the rock ledge referred to above has removed the resistance to motion of the broken masses of earth and rock within the limits of this extensive break in the bank more than one-half mile from the Canal, it is probable that intermittent movements will occur until stability is attained, and that when attained the stability will be permanent.

On account of the large amount of material removed from the slide, it is not probable that sudden movements of large masses will again occur, or that further movements will be more rapid than the rate of removal by the dredges.

Plates Nos. 8 and 10 show the conditions existing at the worst stage of the slides, and plates Nos. 9 and 11 the present conditions.

The plant operated by the dredging division continued as reported last year, except that the large seagoing ladder dredge *Corozal* was sold to the United States Engineering Office, Philadelphia, and delivered to representatives of that office on November 7, 1919. Inspections were made from time to time of the slide areas in Gaillard Cut with special reference to drainage conditions and evidence of lack of stability. Where necessary, ditches were excavated and banks sloped by the hydraulic graders to facilitate the drainage of the banks. The usual work of destruction of water hyacinths was continued. During the year 2,500,000 plants were pulled and

destroyed, and 403,500 square yards were cleared by spraying with an arsenic solution.

For further details of dredging division operations, see Appendix A.

MARINE DIVISION.

Capt. L. R. Sargent, United States Navy, remained in charge of this division until April 15, 1920, when he was relieved from duty with the Canal by orders from the Navy Department; he was succeeded by Capt. E. P. Jessop, United States Navy.

The floating equipment was increased during the year by the return of the Canal tugs *La Boca* and *Miraflores*, which had been loaned to the War Department for service during the war, and by the acquisition from the Navy Department, for use and custody of the Canal, of the U. S. S. *Favorite*, a vessel of 500 tons dead-weight, for service as a lighthouse tender and as a salvaging vessel. The *Favorite* takes the place of an old French claret that has been used as a lighthouse tender and that has been worn out in the service.

A two-story concrete building located at Gatun was completed and is occupied as a combined storehouse, repair and office building for the lighthouse subdivision.

The board of local inspectors, under the supervision of the marine superintendent, made the prescribed semiannual inspections of all floating equipment of the Canal and Panama Railroad, and, in addition, inspected in dry dock 42 hulls of commercial ships and Canal and railroad plant. Inspections and tests were made of 67 boilers in floating equipment, 60 on Canal and railroad plant, and 7 on vessels belonging to the United States Army. Licenses were issued to 10 pilots, 13 masters, 21 mates, 30 engineers, and 126 navigators of motor boats.

A total of 2,478 commercial vessels made the transit of the Canal, 1,180 from the Atlantic to the Pacific and 1,298 in the reverse direction. Commercial cargo carried through the Canal amounted to 9,374,499 tons, of which 4,092,516 tons were from the Atlantic to the Pacific and 5,281,983 from the Pacific to the Atlantic. Three hundred and twenty-nine ships, with a cargo tonnage of 1,129,616, passed through the Canal in ballast; 105, with a tonnage of 458,383, were northbound, and 224, with a tonnage of 671,233, were southbound. United States Government vessels transiting the Canal free of tolls aggregated 266, of which 51 were northbound and 215 southbound. Of these 218 pertained to the United States Navy, 18 to the Army, and 30 were merchant ships with naval cargo. The tonnage transported by these ships amounted to 365,898, of which 150,814 tons were in naval vessels, 27,275 in Army vessels, and 187,809 tons were transported in merchant vessels under control of the Navy. Five naval vessels of other nations, totaling 69,536 tons displacement, transited the Canal. The traffic for the year showed an increase as compared with the preceding year, in vessels, tonnage, and cargo, amounting, respectively, to 22.37 per cent, 39.38 per cent, and 36.31 per cent. The number of commercial vessels transiting the Canal was 16.34 per cent above all previous yearly records. The distribution as to nationalities of the ships transiting the Canal during the year was as follows: United States, 1,129; British, 753; Japanese, 118; Norwegian, 106; Chilean, 79; Peruvian, 75; French, 60; Span-

ish, 41; Dutch, 29; Italian, 26; Swedish, 19; German, 17; Danish, 9; Panamanian, 4; Brazilian, 3; Chinese, Portuguese, and Russian, 2 each; Belgian, Colombian, Costa Rican, and Uruguayan, 1 each.

For further details attention is invited to Appendix B.

MECHANICAL DIVISION.

The work of this division continued in the charge of Commander E. G. Kintner, United States Navy, as superintendent. The principal changes and additions to plants included the installation at Balboa shops of a reclaiming roll for rerolling miscellaneous steel and iron scrap into round and rectangular section rods and bars; the roofing over of the space between buildings 2 and 3, Balboa shops, to relieve the congestion of the pipe shop; the installation of a large horizontal boring mill at the Balboa shops; and the construction (in progress) of a light repair shop adjacent to the commercial piers in Cristobal to facilitate repairs to ships at those piers.

The average force employed in the shops was 2,869 per month, 1,002 gold and 1,867 silver employees, as compared with corresponding averages of 696 gold and 1,658 silver employees for last year.

The value of work performed was \$6,454,219, of which 59.87 per cent was marine work, 19.73 per cent railroad work, 12.17 per cent miscellaneous, and 8.23 per cent manufacturing. Of the total work performed 35.09 per cent was for the Canal, 43.38 per cent for individuals and companies, 17.16 per cent for the Panama Railroad, and 4.37 per cent for Government departments.

At the Balboa dry dock 16 vessels were docked pertaining to the United States Army and Navy, 33 pertaining to The Panama Canal, and 34 belonging to outside commercial interests. At the Cristobal dry dock corresponding figures were 22 ships belonging to the Army and Navy, 20 to the Canal, and 43 to outside commercial interests. The total number of vessels, other than tugs, barges, and dredges, on which work was done was 1,064—422 at Balboa shops and 642 at the Cristobal shops.

The principal items of work at the Balboa shops include: Completion of overhaul and repairs to ex-German merchant steamers *Uarda* (renamed *Salaverry*) and *Anubis* (renamed *Paita*); the former was delivered for operation on July 14 and the latter on October 6, 1919, the *Anubis* having been considerably delayed by nondelivery of parts from the United States, held up by strikes; completion of the repairs and alterations to the steamship *Cristobal*, of the Panama Railroad Steamship Line, the work including not only a thorough overhaul but also very extensive alterations. The vessel was changed from a coal burner to an oil burner; the accommodations for officers and crew were rebuilt; the passenger space was entirely changed and greatly enlarged, as was also the cold-storage system. The overhaul included installation of new boilers, refitting of main engines and practically all auxiliaries in the ship. The steamship *Azov* was given a general overhaul of machinery and repairs in dry dock to the hull, including renewal of about 25 shell plates, numerous frames, and the lower half of the stem. The U. S. S. *Melville*, after arriving at this plant in tow in a disabled condition, with boilers out of commission, had installed modified furnace fronts and certain changes in her oil-

burning system. The U. S. battleship *Rhode Island* was placed in dry dock on account of a broken outside coupling. Repairs were made to the strut fastenings which had been loosened; new coupling and new propeller shaft were made from rough machined spares carried by the vessel. The Navy Department ordered this vessel to proceed to Mare Island Navy Yard under one engine, when it was found, after removal of the stern tube shaft to the shop, that it was cracked; there was no material on the Isthmus available for the manufacture of this part. The Peruvian cruiser *Lima* received extensive repairs, particularly to the boilers and hull structure in the vicinity of the machinery spaces, rudder, and steering gear. A new radio house was constructed; also a new pilot house. The steamship *Acajulla*, belonging to the Pacific Steam Navigation Company, was altered from coal burning to oil burning, and received extensive repairs to her hull and machinery. The United States submarines stationed at Coco Solo were dry-docked and given miscellaneous repairs. The steamship *Olockson* (owned by the United States Shipping Board), which had been sunk near the Pacific entrance to the Canal to extinguish a fire in the cargo of gasoline, was salvaged. Dredges, scows, and tugs of the dredging division were overhauled and repaired. On account of the slides which took place this year the amount of these repairs was considerably increased. Four new 61-foot steel-frame passenger coaches were completed in the car shop and put into active service. These cars are notable on account of being trimmed with caoba blanca, a native wood; they were finished in the natural color. Twenty-five 40-ton flat cars were rebuilt for the Alaskan Engineering Commission.

The principal items of work at the Cristobal shops included: The steamship *Culebra* received extensive repairs and alterations in connection with restoring her from her condition as a cattle carrier to her previous condition as a seagoing dredge; the vessel was moved to Balboa shops on April 6, 1920, for the completion of the work on account of the many interruptions at Cristobal; salvage of the steamship *Marne* (owned by the U. S. Shipping Board). This vessel was raised after being sunk in Cristobal Harbor to extinguish a fire in the cargo of benzine. The vessel caught fire a second time and sank in the harbor on account of an explosion; she was again raised and unloaded.

For further details of the operations of the mechanical division see Appendix C.

SUPPLY DEPARTMENT.

The operations of this department continued under the charge of Mr. R. K. Morris, chief quartermaster.

Labor.—The force for the month of June, 1920, consisted of 4,608 employees on the gold roll and 17,023 on the silver roll. In June, 1919, there were 3,290 employees on the gold roll and 17,071 on the silver roll. The increase in the gold roll was principally due to the operations of the building division in the construction of the Army posts and of the mechanical division in the larger repair jobs for steamships. There was a slight increase in the gold roll on account of the displacement of certain alien employees on the silver roll. The maximum number of employees on the silver roll was in February,

when 18,231 were employed, and the minimum number in November, when 16,243 were employed.

Quarters.—Applications on file for family quarters, gold employees, were 618 on June 30, 1920, as compared with 306 on June 30, 1919. On the silver roll there were 747 applications on file on June 30, 1920, for family quarters. By arrangement with the War Department, the old Canal village of Las Cascadas, which was turned over to the Army for occupation by troops in 1910, was turned back to the Canal in October, 1919. Sixteen of the quarters suitable for the purpose were removed from Las Cascadas and reerected for quarters of gold employees in existing Canal towns. The remainder of the buildings were made available for rental to a selected class of silver employees temporarily out of work, with allotments of land for their use in gardening, poultry raising, and growing of fruit trees to assist in the support of themselves and their families. At the end of June, 1920, 40 families had taken advantage of this opportunity to have a home at a nominal cost.

Transportation facilities.—Animal transportation was further reduced and replaced by motor transportation during the year. The animals still in the service were used for drawing mowing machines, garbage wagons, and material wagons where roads do not permit the use of trucks. On June 30, 1920, 29 horses and 143 mules were in the transportation service, a reduction of 10 horses and 51 mules from the figures of a year ago. The motor vehicles in service on June 30, 1920, and for the same date last year are shown in the following table:

	1919	1920		1919	1920
Ford cars, 4-ton delivery.....	78	57	Combination passenger and delivery, changeable.....	4	17
1-ton trucks.....	47	78	Hearses.....	1	2
1½-ton trucks.....	7	7	Ambulances.....	7	8
3½-ton trucks.....	15	15	Motor cycles.....	56	58
2½-ton trucks (electric).....	3	3	Buss, 1½-ton.....		1
2-ton trucks.....		4			
Ford passenger cars.....	11	16			

In the cattle industry there were in service on June 30, 1920, 208 horses and 110 mules, corresponding figures for last year being 190 horses and 137 mules.

Materials and supplies.—The total value of materials received during the fiscal year was \$7,812,258.86, as compared with \$7,832,845.61 for the previous year. The value of materials issued from the different storehouses was \$11,966,308.81, as compared with \$12,157,090.24 for the previous year. The value of materials on hand June 30, 1920, was \$5,249,300.15, as against \$6,001,451.24 on June 30, 1919. The value of materials of all classes sold from the storehouses of the supply department was \$3,025,698.18. Sales were made to 3,265 steamships to the amount of \$1,274,556.18, being an increase of \$97,039.85, as compared with last year. A total of 248,294 requisitions and foremen's orders was handled, distributed as follows: General storehouse, Balboa, 156,415; Cristobal storehouse, 76,243; Paraiso storehouse, 15,636. The consumption of cement for the year was 158,089 barrels.

Obsolete material.—Two scrap shears were purchased and installed at Mount Hope scrap yard to facilitate the cutting and classifying of scrap in order to secure more favorable prices. It is expected that all scrap now on hand will be cut up, classified, and sold by December 1, 1920, at which time the scrap shears will be moved from Mount Hope to the general storehouse at Balboa, from which point all future scrap operations will be handled. During the year 20,378 tons of American scrap were sold.

Fuel-oil tanks.—Contract was entered into with the West India Oil Company to furnish 300,000 barrels of fuel oil at \$1.12 per barrel, delivered into Panama Canal tanks at Mount Hope, and 700,000 barrels at \$1.29 per barrel delivered into Canal tanks at Balboa. This contract expired on June 30, 1920, but with the privilege of renewal to December 31, 1920. In view of the favorable price the Canal exercised its option of renewal. Two 55,000-barrel capacity concrete tanks under construction during the year, one at Balboa and one at Mount Hope, were 90 per cent complete. The total amount of fuel oil handled by the Balboa and Mount Hope plants amounted to 5,620,986 barrels, including both receipts and issues; 1,195 vessels were fueled during the year. The amount of 484,045 gallons of bulk gasoline was obtained from the purchase of salvaged cargo of the steamship *Olockson*, which was wrecked by fire in the vicinity of the Pacific entrance to the Canal.

Panama Canal press.—The value of stock on hand at the close of the year was \$109,605.55, as compared with \$98,103.52 for the preceding year. The increase was due to additional stock required for the printing of commissary coupon books. On account of the high price in the United States, it was decided to install a plant for the printing of our commissary coupon books, with an estimated saving of \$30,000 annually. The total value of material issued from the printing plant was \$158,406.79, as compared with \$147,627.39 for the previous year.

Subsistence.—The supply department operated the hotels Tivoli and Washington, Hotel Aspinwall, on Taboga Island, three cafeterias, four restaurants, and two lunch rooms for gold employees, and three labor messes for silver employees. The line restaurants and cafeterias showed a net loss of \$4,755.84, and the labor mess a profit of \$5,516.84. The Hotel Tivoli was operated at a net profit of \$15,763.47, and Hotel Washington was operated at a net profit of \$24,046.01. The patronage at the Tivoli and Washington showed a marked increase during the dry season on account of increased travel of the general public after the removal of travel restrictions caused by the war.

Commissary division.—The general market conditions were abnormal throughout the year, and it was difficult to secure and maintain an adequate supply of all commodities. There was a reduction of stock on hand and in investment in commissary stocks. There was an increase in the business done by the bakery, coffee-roasting plant, Cristobal laundry, ice plant, milk-bottling plant, and industrial laboratory. The abattoir, ice-cream plant, sausage factory, and Ancon laundry did a decreased volume of business. On account of suspension of beef shipments to the Army in the United States, fewer cattle were slaughtered than for 1919, but the local consumption was greater. The Costa Rican agency, which had been suspended on

account of uncertain transportation facilities in 1919, was reopened following the renewal of regular steamship service. This agency supplies vegetables and fruits, and occasionally sugar and coffee, in better condition and at less price than afforded by the markets of the United States. By-products from the abattoir to a total value of \$589,142.67 were shipped to the United States and there sold. During the year a total of 6,256,941 pounds of beef were exported to the Army in the United States. The total area cleared for pastures in the Canal Zone is 46,165 acres.

For further details see Appendix D.

ACCOUNTING DEPARTMENT.

This department continued in the charge of Mr. H. A. A. Smith, as auditor. Mr. E. P. Sine resigned his position as collector and was succeeded by Mr. T. L. Clear, the former collector, upon his return from service overseas in the Inspector General's Department of the United States Army, in September, 1919. Mr. J. H. McLean, paymaster, resigned on November 15, 1919, and Mr. R. W. Glaw, assistant paymaster, was promoted to fill the vacancy on January 24, 1920.

The paymaster disbursed a total of \$38,426,733.29, of which the sum of \$15,134,762 was on account of the Panama Railroad Company. Employees on the gold roll of The Panama Canal were paid \$8,391,066.16, and employees on the silver roll \$6,505,810.88. The sum of \$8,395,094.25 was paid on miscellaneous vouchers. Collections by pay-roll deductions were \$5,191,946.63, of which the sum of \$4,220,524.88 was collected for coupon books. Of the total collections on pay rolls, the sum of \$4,948,704.48 was disbursed directly, by the paymaster, the balance \$243,241.95 being transferred to the collector's accounts. A total of \$1,224,000 in cash was imported from the United States by the paymaster. The collections repaid to appropriations amounted to \$14,745,634.31, as compared with \$10,364,875.07 during the previous year. The sum of \$8,848,978.06 was collected for deposits as miscellaneous receipts.

For the payment of tolls and bills for supplies and services, there were deposited with the Assistant Treasurer of the United States to the credit of the collector \$2,287,783.21. Deposits for the same purpose made with the collector on the Isthmus amounted to \$18,631,811.32. The direct deposits with the collector on the Isthmus for tolls and other bills show an increase of \$6,500,000 over the figures of last year, and the deposits with the Assistant Treasurer of the United States to the credit of the collector show a decrease of over \$2,000,000. The total deposits, \$20,919,594.53, exceed the total for last year by \$4,476,220.50.

Money order funds to the amount of \$1,501,000 were transferred to the Postmaster General of the United States in payment of money orders drawn on the United States. Collections on account of the Panama Railroad Company amounted to \$21,532,848.43, an increase over last year of \$1,191,903.47. The tolls actually collected for vessels transiting the Canal amounted to \$8,496,633.40. The total earned amounted to \$8,516,469.80, and the sum of \$19,836.40 remaining unpaid being charges on certain Government vessels that may not be finally held liable for the payment of tolls.

As a matter of interest it will be stated that the tolls earned for the year would have been \$9,955,754.32 if the Panama Canal rules of measurement had been applied in all cases. The total loss to the Canal since it was opened to traffic on account of the present legal restrictions to the application of the Panama Canal rules of measurement amounts to \$5,109,904.24 to June 30, 1920. Benefits to vessels on account of the existing rules of measurement are distributed as follows:

	American.	Foreign.
Vessels plying between American ports.....	\$237,956.85	\$67,881.50
Vessels plying between American ports and canal ports.....	97,956.05	1,325.90
Vessels plying between American possessions and American ports.....	34,908.60	43,495.75

These figures, subtracted from \$5,109,904.24, give the sum of \$4,626,379.59 as the amount of saving to vessels engaged in foreign trade.

The total appropriations for the Canal and its immediate adjuncts by Congress to June 30, 1920, amount to \$467,431,257.41. Deducting from this total the amounts appropriated for annual payments to the Republic of Panama, \$2,500,000, regulating commerce and censorship of mails, \$170,000, fortifications, \$34,658,400.81, and for operation and maintenance, \$50,511,914.68, leaves \$379,840,941.92 appropriated for the construction of the Canal and its immediate adjuncts. Of the total appropriated for construction, \$4,329,898 for colliers and coal barges, \$2,093,190 for pier No. 6, Cristobal, \$300,000 for work on the colliers *Ulysses* and *Achilles*, and \$720,000 for reboiling and repairing the steamships *Ancon* and *Cristobal*, were specifically exempted by law as a charge against the amount of the authorized bond issue. These being deducted from the total appropriations for the construction of the Canal and its immediate adjuncts, gives the sum of \$372,397,853.92 as chargeable to bond issue, and makes available for appropriation within the limit of the cost of the Canal and the authorized bond issue the sum of \$2,825,302.08.

Current appropriations.—The cash balance of the current appropriations for operation and maintenance, sanitation, and civil government, and for construction, on June 30, 1920, amounted to \$12,347,642.76. Including the amount of the accounts receivable and transfer of appropriations to be made in payment for work done and supplies furnished, the total of the cash and cash items was \$16,325,017.48. The liabilities immediately payable, including the amount to be paid the United States Shipping Board for the two coal barges, which are now in service, amount to \$6,004,775.71. The additional ordinary obligations outstanding, viz, \$3,601,343.84 on outstanding orders, \$3,480,460.30 on unfilled requisitions, and \$2,234,701.77 on allotments for special work, make a total of the regular obligations of \$15,321,281.82, and leaves a balance of \$1,003,736.26. This balance is a great deal more than offset by the reserves for repairs (\$484,268.74) and by the amount due employees for leaves earned (\$813,591.01)—a large portion of both of which may be required at any time—and by the reserves for depreciation on equipment, \$2,442,029.86.

As stated last year, too much stress can not be given to the necessity of keeping the appropriations for Canal operations and main-

tenance on a continuing rather than on an annual basis, and to the maintenance of an adequate cash balance to carry on the business operations. Work for the Army and Navy has been done on a very large scale in the past and will continue to be done. Delays in payment seemingly can not be avoided. This throws a burden on Canal funds that must be recognized and provided for. The cash balance with which to operate can be provided by a special appropriation, or, what is believed to be better and more in keeping with the law relative to the business operations of the Canal, by considering the reserves for depreciation as direct obligations against the appropriations for operation and maintenance. Fluctuations in the value of stock on hand directly affect the cash balance, and if the value of the stock falls below the amount authorized for investment in stock, then the difference must be considered as a direct obligation chargeable to the appropriation at any given time.

The ordinary expenses for operation and maintenance, including those of civil government and sanitation, were \$6,548,272.43, against \$6,112,194.77 expended in 1919. The expense of maintaining dredging increased from \$1,152,188.99 to \$1,611,359.78, due to the slides in Gaillard Cut. Offsetting the total expense of operation and maintenance are the amounts earned as tolls, \$8,493,082.56; the amount collected as licenses and taxes, court fees and fines, \$153,102.88, and as net profits on business operations, \$239,686.13, or a total of \$8,885,871.57. The revenues earned were thus in excess of current expenses by \$2,387,594.14. At this rate, by June 30, 1921, the collections for tolls and other Canal revenues will exceed by \$1,000,000 or more the total current expenses of operation and maintenance of the Canal to that date, after which there should be an excess of \$5,000,000 or more each year.

The total revenue derived from business operation carried on with Panama Canal funds amounted to \$14,705,371.82, as against a total of \$13,684,881.18 received during the preceding year. There was in 1920 a net profit of \$239,686.13 to be covered into the Treasury as miscellaneous receipts. The annual increases in business operations at the Canal is shown by the following table, giving the number and amounts of formal bills:

Year.	Number of bills.	Amount.	Year.	Number of bills.	Amount.
1915.....	8,686	\$12,197,170.74	1918.....	22,070	\$20,887,460.60
1916.....	13,754	11,786,187.91	1919.....	24,210	25,272,815.50
1917.....	16,386	17,007,342.16	1920.....	28,825	28,654,731.64

The capital expenditures from construction appropriations total a little in excess of \$1,000,000, the principal items being as follows: Dredging inner harbor at Balboa, \$34,916.25, involving the removal of 63,050 cubic yards of material at an average division cost of \$0.4991 per cubic yard, of this material 84 per cent was earth and 16 per cent rock; sanitary fills and ditches, \$9,503.54; settlement of claims for private property within the Canal Zone, \$546,217.05; completion of Ancon hospital buildings, \$19,877.26; the new garbage incinerator at Cristobal, \$115,873.52; and completion of Pier No. 6, at Cristobal, \$113,471.94. There was also transferred to the construction account about \$900,000 which had heretofore been tenta-

tively charged to operation and maintenance funds. The main items included in this amount were: Dredging Cristobal Harbor, \$130,000; extensions to the electric current system, \$233,000; fuel oil plants, \$82,000; shop additions, \$186,000; work on locks, \$160,000 aids to navigation, \$53,000. Amounts allotted to construction appropriation and available for expenditure include \$2,329,898 for the two new coal barges, \$250,000 for work on the colliers *Ulysses* and *Achilles*, \$325,000 for dredging, and \$81,000 for the payment of land claims, with certain other small items totalling a little in excess of \$3,000,000.

The charges to capital additions covering expenditures for permanent improvements the cost of which was payable from operation and maintenance appropriations were a little in excess of \$900,000, of which the main items were: Extensions to the power and lighting system, \$84,858.56; additions to fuel oil plant, \$90,219.50; new garages, \$20,425.56; fills, roads, and sewer systems, New Cristobal, \$187,369.43; terminal storehouse and shop building, Cristobal piers, \$46,182.33; fenders, Miraflores locks, \$9,623.32; road from Balboa shops to Diablo, \$34,452.44; repairs to Docks 13 and 14, Balboa, \$32,481.84; quarters for gold employees, \$183,000; quarters for silver employees, \$48,000; and miscellaneous, \$87,061.14.

The total expenditures for construction of public works in the cities of Panama and Colon from 1904 to the end of the fiscal year were \$1,430,208.91 and \$1,220,382.03, respectively. The total expenditures for operation and maintenance of public works were \$911,083.54 for Panama and \$798,127.58 for Colon. Under the agreement with the Republic of Panama all expenditures incurred by the United States for construction, operation and maintenance of waterworks, sewers, and pavements in the cities of Panama and Colon are to be reimbursed to the United States within a period of 50 years from July 1, 1907. Besides being authorized to currently reimburse itself from water rental collections for expenses of the operation and maintenance, the United States liquidates the expenditures for construction by quarterly charge of one-fourth of the part of the capital cost, ascertained by dividing the amount thereof by the number of years the contract has to run. In addition, the Republic of Panama pays interest at the rate of 2 per cent per annum on the capital cost balances and on the proportionate cost of waterworks in the Canal Zone used for supplying water to the two cities, based upon the quantity consumed. To liquidate the capital cost there has been paid to the United States, or is immediately due, the sum of \$563,-442.21, leaving a balance unpaid of \$1,106,926.48 for the work in Panama, and \$980,222.25 for the work in Colon, payable in installments during the contract period. The amount which is payable immediately under the agreement is \$94,179.05 and is covered by bills for the difference between the current charges for the work, plus the quarterly payments required, and the amount collected as water rentals. The Panama Canal continues to maintain the pavements in the two cities under a temporary agreement effected at the beginning of the fiscal year 1918, under which reimbursement is still obtained through water rental collections.

There were audited prior to payment 403,231 pay roll items. Upon the final audit by the auditor for the War Department, 65 errors were discovered, involving the sum of \$274.58. The total

amount of the rolls involved was \$15,141,321.37. The gross deductions on pay rolls aggregated \$6,650,009.19. There were 347 examinations of the accounts of employees of The Panama Canal and Panama Railroad charged with the collection, disbursement and custody of Canal and railroad funds.

The time inspection forces checked the timing of 10,442 gangs, with a total of 519,869 employees. On account of corrections made in the timebooks by the inspection forces, there was a saving of \$3,822.90.

Under the provisions of section 5 of the Panama Canal act, two claims for damages to vessels passing through the locks were settled, amounting to \$7,243.51; also two claims amounting to \$2,361.98 for damages to vessels in the Canal outside of the locks. Minor damages to vessels were repaired at an expense of \$5,179.12. The total expense for all claims of this kind was \$14,784.61, all settled without recourse to the courts; corresponding figures for the previous year were \$16,739.19.

The schedule bonds of employees of The Panama Canal and Panama Railroad, executed to insure the faithful performance of their duties, were continued with the Maryland Casualty Company. The total liability for Canal employees was \$430,000 and for railroad employees \$381,000. No claims were made during the year against the surety company for defalcations of employees.

Commissary books for the payment of commissary and other purchases from the Canal were issued to employees on pay roll deductions to the value of \$5,627,605, which was \$1,100,000 in excess of the issue for the preceding year. The total issue, including cash and pay roll deduction sales, was \$7,727,437.50, as compared with a total of \$6,510,997.50 for the preceding year. Meal tickets to the value of \$46,329.50 were used by employees on the silver roll, a reduction of \$21,000 from the amount used during the previous year.

The unexpended balance in the Canal Zone funds, amounting to \$6,220.11 was deposited in the Treasury as miscellaneous receipts. The collections for licenses and taxes were \$15,354.05; court fees and fines, \$27,694.45; postal receipts, \$109,117.48; with miscellaneous items amounting to \$57,210.07, making a total of \$209,376.05; the corresponding figures for the previous year being \$136,876.29. The cash balance of miscellaneous trust funds in the hands of the collector increased from \$683,085.95 on June 30, 1919, to \$780,757.96 on June 30, 1920. There were issued 125,122 money orders to the value of \$3,198,989.93, an increase of \$90,311.71 over the previous year. Since the establishment of the money-order business on the Canal Zone, 2,454,002 money orders have been issued, to the value of \$57,524,064.81.

The revenue derived from the operation of the various clubhouses amounted to \$427,118.67, as compared with \$463,409.39 received during the prior year. The expenditures amounted to \$452,600.34.

For settlements under the injury compensation law there were pending 4 death cases and 141 injury cases at the beginning of the year. Three of the death cases were approved and 1 was disallowed; 16 of the injury cases were disallowed, the remainder being approved for payment wherever the time lost was in excess of 3 days. There were reported 4,451 accidental injuries and 17 accidental deaths of employees during the year. Compensation was allowed in 1,471

cases of injury and 3 cases of death. Ten death cases are pending on account of injuries and deaths during the past year. There was paid to employees for injuries \$17,705.17; to beneficiaries for deaths of employees, \$3,946.67; to persons injured during the year there was paid the sum of \$25,123.68; and to beneficiaries of employees dying as a result of injury in line of duty, \$549.83. The payment of \$1,200 to five inmates of the Corozal farm was authorized upon their repatriation.

For further details see the report of the auditor, Appendix E.

EXECUTIVE DEPARTMENT.

This department continued under the Governor, assisted by Mr. C. A. McIlvaine, as executive secretary. In addition to the routine reports of different subdivisions of this department, the following general remarks are submitted with reference to matters affecting the compensation and living conditions of employees of the Canal and Panama Railroad:

A census taken by the police division in June, 1920, shows a total civilian population of the Canal Zone of 21,650, of whom 9,529 were employees. Three thousand four hundred and thirty-four were male Americans, 5,652 male aliens, 369 female Americans, and 74 female aliens. The turnover in force of Americans, represented by new employees and separations from the service, was approximately 30 per cent. There was an increased emigration to Cuba and the United States of the labor force of West Indians, but there remained available at all times a larger force than was required by the Canal and railroad. Careful analyses show increases in the cost of living in the Canal Zone since 1914 as follows: Food, 101.11 per cent; clothing, 71.59 per cent; household expenses, 105.30 per cent; and personal expenses, 65.47 per cent.

Adjustments were made from time to time of the rates of pay of American employees on the gold roll in accordance with the policy of allowing an increase of 25 per cent above current rates in the United States for similar employment. A general exception to the rule of granting the full 25 per cent increase was made in the case of all employees whose basic rate in the United States was affected by the legislative bonus increase of \$240 per annum. This exception was made on account of lack of appropriations in the civil government branch to pay the increases on account of the additional \$120 bonus in the United States. The additional compensation to Canal employees on account of the increased bonus is reserved pending further action of Congress. Adjustments have been made from time to time in the compensation of West Indian employees in order to meet the increased cost of living. In these adjustments the rates effective in 1914 were taken as a basis and the minimum rates and earnings were given primary consideration, since it is on the lowest paid classes of workmen that the burdens and increases of living costs are heaviest. The following statement shows the general trend of wages for the common labor class since 1914:

	Cent's per hour.		Cents per hour.
May 1, 1914.....	10	November 1, 1918.....	17
January 1, 1917.....	12	July 1, 1919.....	19
October 1, 1917.....	13	February 1, 1920.....	21
May 1, 1918.....	15	July 1, 1920.....	23

Immediately following the adjustment of February 1, 1920, the organization of West Indian employees demanded an increase of 7 cents an hour and certain other changes in conditions of employment. The refusal to grant these demands was met with a strike on February 24, when from 15,000 to 17,000 men quit work. Thanks to the readiness of the American employees to turn to whatever work the exigencies required, the Canal was kept in operation without interruption on account of the strike. The strike was broken by the return of the men to work on March 2, and the general rule was followed of reemploying the mass of strikers who were not leaders as new employees, with a loss of certain rights and privileges pertaining to continuity of service.

BUREAU OF CLUBS AND PLAYGROUNDS.

Clubhouses were operated for gold employees at Balboa, Ancon, Pedro Miguel, Gatun, and Cristobal; also for silver employees at La Boca, Red Tank, Paraiso, Gatun, and Cristobal. The clubhouse building at Balboa was improved by an enlargement of the reading room and the installation of bookcases in the library. The main floor of the Cristobal clubhouse was enlarged by the removal of the side walls of the building and the inclusion of the porch in the floor area. Local entertainments were given as usual, and entertainers have come down from the United States about once in two months. Moving pictures were exhibited in all clubhouses. The Balboa clubhouse has supervised the physical education of the grammar schools and of the high schools. One of the most useful and successful benefits of the physical education developed was instruction in swimming. All members of the senior class of the Balboa high school were required to pass a rigid test, before graduation, consisting of swimming and life saving. New play sheds were added to the equipment of the Pedro Miguel and Gatun clubhouses, and one was erected near Folks River beach in New Cristobal for the children of that community; the sheds are approximately 42 by 80 feet. The average daily attendance of children 3 to 5 years of age on the five playgrounds was 164, and of children 6 years and over, 552. Decoration Day was observed on all playgrounds by appropriate patriotic exercises. A community Christmas pageant, with over 165 children and 50 adults participating, was staged on the lawn of the administration building on Christmas night by employees of this bureau.

RECORD BUREAU.

In addition to maintaining the general files and permanent records of the Canal and railroad, this bureau has charge of the classification of records turned in by the field officers; publication of all rules and regulations, circulars, etc., documents, and publications; the custody of timekeeping records; the receipt, distribution, and dispatch of all mail for all offices of the administration building other than the accounting department; and the operation of the library system. The library has five branch libraries in the Canal Zone clubhouses. In the libraries there were 5,111 volumes received, classified, catalogued, and prepared for circulation. On June 30, 1920, there were 1,139 registered borrowers, with a circulation of 1,625 volumes per month.

PERSONNEL BUREAU.

This bureau maintains the personal files of each gold employee, accounting for the history of service, salary status, leave of absence, transportation; organization status of the different divisions and bureaus of the Canal and railroad; and the records of all new employees requisitioned from the United States. Under the provisions of the act for the retirement of the employees in the classified civil service the bureau began the examination of personnel files as a basis for the necessary reports on employees entitled to the benefits of this act.

PROPERTY BUREAU.

This bureau has the actual property accounting for the entire Canal and railroad organizations. Physical checks of the property are made twice annually and the accounts of responsible officials entering on leave, transferring, or resigning are checked in each instance.

BUREAU OF PAY ROLLS.

This bureau is charged with the preparation of all pay rolls of the Canal and Panama Railroad, based on the daily time reports. Preparation of the rolls involves deductions for collections for coupon books and other charges to employees paid by pay-roll deduction. Pay receipts prepared for Canal employees totaled 46,947 for gold employees and 175,622 for silver employees.

BUREAU OF STATISTICS.

The routine work of this bureau included the compiling of vital statistics for the health department; navigation statistics for the marine superintendent; preparation of data for wage adjustments; compilation of matter for The Panama Canal Record; investigations of cost of living; and, in addition, a special study of Canal services for official report or for replies to private inquiries.

DIVISION OF SCHOOLS.

The net enrollment for the year was 2,004 at the white schools and 1,481 at the colored schools, a total of 3,485 as compared with 3,006 in 1919. The average daily attendance at the white schools was 1,588.5 and at the colored schools 864.9, making a total of 2,453.4 as compared with 2,178.5 for the previous year. The number of white teachers employed during the year was 74, an increase of 2 over the preceding year. There was an increase of 2 colored teachers, the number being 24. The best standards of the public schools in the United States were followed in the Canal Zone schools. Physical examinations were made in both white and colored schools of pupils and proper steps taken to remedy defects discovered. Manual training and household art classes were held at Cristobal for the white pupils of Gatun and Cristobal schools and at Balboa for the white pupils of the Pedro Miguel, Ancon, and Balboa schools. Instruction in music was continued and satisfactory progress made. The night school of Spanish was conducted at Cristobal and night

school of English, Spanish, French, shorthand, and manual training was conducted at Balboa. On July 1, 1919, there were 44 apprentices taking the apprentice courses. There were 14 new enrollments; 10 were graduated, 3 resigned, and 1 was discharged for unsatisfactory progress. At the close of the year there were 48 apprentices.

POLICE AND FIRE DIVISION.

In addition to routine work the police division made numerous confidential investigations and reports of matters affecting the Canal and the general interests of the United States on the Isthmus. Considerable extra work was handled in the police division during the strike of the silver employees. There were 4,202 arrests during the year, of whom 4,026 were males and 176 females. A monthly average of 92.25 prisoners served sentences in the common jails. The total value of labor performed amounted to \$19,486.94. Monthly patrols of the interior sections of the Canal Zone were continued to determine if any new clearings or cultivations were made or if any new buildings were being constructed by private parties in the depopulated areas. There were 23 arrests and 2 convictions for trespassing on Canal Zone lands. Fifty-four persons were deported from the Canal Zone; of this number 49 were convicts who had completed terms of sentence in prison. Sixty-five convicts were received at the penitentiary during the year. The aggregate sentences imposed on convicts amounted to 83 years, 9 months, and 21 days. There were 51 discharges from the penitentiary on account of completed terms of imprisonment. At the close of the year 53 convicts remained in custody.

Periodical inspections were made by the fire division of all government buildings, docks, storehouses, yards, etc. Fire hose and fire extinguishers were maintained in good condition. Fifteen volunteer fire companies were maintained until March 1, 1920, when the number was increased to 22 companies. Each company is composed of a maximum of 20 men, employees of the Canal and railroad. There were 129 fires and 14 false alarms reported during the year. Eight fires occurred in property of The Panama Canal, 21 in property of the railroad, 3 in property of the United States Army, and 15 in property of private individuals and United States Shipping Board. The total losses from all fires was \$3,567,083.85, of which \$1,970,000 was a loss due to a fire on United States Shipping Board steamship *Marne*, \$1,502,000 to a fire on United States Shipping Board steamship *Olockson*, and \$47,000 to the Army storehouse at Empire. Aside from the exceptional incidents of the fires on the two United States Shipping Board steamers, fire losses on the Canal Zone were very low.

DIVISION OF CIVIL AFFAIRS.

Bureau of posts.—Total receipts from the postal service were \$138,391.60, an increase of \$1,764.20 above the previous year. Interest received on deposit money-order funds amounted to \$22,141.38. Under the agreement of December 3, 1904, with the Panaman Government, 40 per cent of the face value of postage stamps sold was paid to the Panaman Government, amounting to \$33,783.97.

There were issued 125,123 money orders, including deposit orders, amounting to \$3,199,996.98, on which fees amounting to \$10,207.85 were collected. Compared with the preceding year there was a decrease of 15,495 in the number of orders issued and an increase of \$91,295.32 in the total amount. Deposit money orders issued during the year totaled \$1,143,225, and payments of deposit money orders, \$1,043,080. A total of 273,778 registered letters and parcels was handled, an increase of 10,168 above the previous year. Customs duties were paid to the Republic of Panama to the amount of \$33,452 on mail parcels for nonemployees and on dutiable articles imported by employees. A total of 107,161 sacks of transit mail from New York and New Orleans was received and dispatched, an increase of 16,070 sacks over the preceding year. Of this total 94,733 sacks originated in the United States.

Bureau of customs.—There was a marked increase in shipping at Canal ports. The total number of vessels entered was 6,023 and the total cleared 6,016, as compared with 4,604 entered and 4,590 cleared during the previous year. American vessels entered numbered 2,779 and total number of American vessels cleared was 2,778, as compared with 1,959 entered and 1,940 cleared during the preceding year.

Shipping commissioner.—The chief of division of civil affairs is also shipping commissioner, and the chief customs inspectors are deputy shipping commissioners. According to law the shipping commissioner and his deputies on the Canal Zone have the same powers as shipping commissioners in the United States ports and American consuls in foreign ports respecting American seamen. There were 4,281 seamen shipped on American vessels and 3,278 discharged, as compared with 4,182 shipped and 3,453 discharged in the preceding year. Six hundred and twenty-four American seamen were subsisted or lodged in the Canal Zone during the year; of this number 288 were returned to the United States at the expense of the appropriation for the relief of destitute American seamen, and the remainder, 336, were signed on vessels and returned to the United States without expense to the Government.

Administration of estates.—There were administered 258 estates of deceased or insane employees of the Canal and railroad, and 26 estates were in course of settlement on June 30, 1920. The amount involved in the settlements made was \$16,314.77, of which \$15,446.87 belonged to decedents' estates and \$867.97 to the estates of insane persons.

COURTS.

In the district courts 359 cases were pending at the beginning of the year, 875 were filed, 952 were settled during the year, and 282 were pending on June 30, 1920. Of the cases pending on the first of the fiscal year 158 were civil, 119 probate, and 82 criminal. The cases filed included 157 civil, 348 probate, and 370 criminal. Those settled included 189 civil, of which 101 were decided, 83 dismissed, 4 transferred, and 1 reported off; 337 probate cases were settled. Of the 426 criminal cases settled, 51 resulted in acquittal, 253 in convictions, 67 were nol prossed, 52 dismissed, and 3 transferred. Eight hundred and seventy-nine marriage licenses were issued. Five deeds were recorded. Collections of costs, fines, forfeitures, fees, etc., in the district courts amounted to \$9,431.17.

In the magistrates' courts there were 13 civil and 4 criminal cases pending at the beginning of the year. During the year 3,744 criminal and 91 civil cases were docketed; 3,838 cases were disposed of, leaving 3 civil and 11 criminal cases pending at the close of the year. Collections from all sources in the magistrates' courts amounted to \$17,863.91.

RELATIONS WITH PANAMA.

The executive secretary conducted the correspondence with the secretary of foreign relations of the Republic of Panama that arose in connection with matters affecting the direct relations between the Canal and the Republic of Panama.

The various acts of Congress and Executive orders affecting The Panama Canal are printed as Appendix K. All details with reference to the operation of the executive department will be found in Appendix F.

OFFICE OF THE SPECIAL ATTORNEY.

Judge Frank Feuille, as special attorney, continued to represent the Government's interests before the joint commission for adjusting land claims of private owners whose property has been taken under the provisions of the treaty with Panama for purposes of construction, operation, maintenance, sanitation, and protection of The Panama Canal. In addition to these duties, he served as counsel for the Panama Railroad Company on the Isthmus and advised the Governor on certain legal questions affecting the administration of the office.

The joint commission appointed by the President of the United States and the President of Panama, in conformity with Articles VI and XV of the Panama Canal Treaty of 1903, was dissolved on March 10, 1920, after all of the cases on the docket had been disposed of with the exception of 16 remaining unsettled. The unsettled cases involve claims arising under leases or contracts for occupancy of land in the Canal Zone made with the Panama Railroad Company. By virtue of section 2 of the sundry civil appropriation act of July 1, 1916, the Congress of the United States declared that the joint commission was without jurisdiction to adjudicate such claims, and that no part of the amounts appropriated by those acts or any other act could be used for the payment of such claims or for the payment of salaries and expenses of the commission in adjudicating or settling such claims. In view of these positive congressional mandates, the American members of the commission declined to proceed to a hearing of the 16 claims involved. The agents of the Panama Railroad have repeatedly advised the claimants, since they originally filed their claims with the commission, that the railroad company was willing to submit the controversy to the courts of the Canal Zone, but these offers have all been refused by the claimants.

In the total of 3,600 claims filed with the commission since its organization, in 1913, the total amount of money claimed was \$21,072,235.41. Of this total number, 2,041 claims were dismissed by the commission on the ground that they had been settled directly between the claimants and agents of the United States. The aggregate demands of these 2,041 claims were \$3,718,885.50; the aggregate amount paid in their settlement was \$764,512.71. Because of a previous award having been made covering the same property, the

commission dismissed 42 claims, involving an aggregate demand of \$388,277.37. For want of jurisdiction the commission dismissed 178 claims, involving a total demand of \$1,504,821.15. There were 10 claims withdrawn upon motion of claimants, the aggregate demands being \$167,397.50. For want of merit the commission dismissed 106 claims, the aggregate demands being \$1,374,040.38. Five claims, involving an aggregate demand of \$1,798.50, were dismissed by the commission, having been found to be duplicates of prior claims. The commission defaulted 318 claims, in which the aggregate demands were \$974,062.28. Award was made by the commission in 844 claims, in which the aggregate demands were \$6,116,682.97 and the aggregate amount awarded was \$880,534.79.

On account of disagreements the joint commission forwarded for settlement by the umpire 40 claims, in which the aggregate sum demanded was \$6,704,490.76. The amount awarded by the umpire was \$860,144.15.

The various joint commissions and umpires appointed under the Canal treaty prior to December 5, 1912, made 21 awards, aggregating the sum of \$304,558. There are no data available indicating the aggregate of these 21 claims as demanded by the claimants. The law department of The Panama Canal was authorized to settle land claims by direct negotiation with the claimants, on August 6, 1908, by virtue of an Executive order of the President. Since that date the law department, and afterwards the office of the special attorney, under authority of the act of Congress of April 7, 1914, have settled directly with the claimants 5,599 claims for damages to land and improvements taken over by the Government for Canal and railroad purposes. The amounts paid in settlement of these claims aggregated the sum of \$1,403,378.86, including the sum of \$764,512.71 paid as direct settlement of 2,041 claims filed with the joint commission and afterwards dismissed by the commission because of such settlements. Some settlements for improvements destroyed were made by the Canal and railroad organizations prior to August 6, 1908, the amounts involved not being available in the records.

The total amounts paid for land and improvement claims under awards of all of the commissions and umpires appointed under the Canal treaty, and under direct settlements made with the claimants since August 6, 1908, aggregate a grand total of \$3,448,645.80. Forty-five land improvement claims were settled directly with claimants during the fiscal year 1920, aggregating the sum of \$33,238.96. At the beginning of the year there were pending before the joint commission 94 claims, involving an aggregate amount of \$2,466,869.81. There were pending on that date before the umpire 13 claims, the aggregate demands being \$3,695,796.56. No new claims were filed during the year.

The joint commission certified to the umpire for his decision 7 claims, the total amount demanded being \$686,516.67. The umpire disposed of a total of 20 claims during the year, wherein the aggregate demands were \$4,379,313.23 and the aggregate award was \$495,776.70. Three of the claims, in which the demand totaled \$253,600, were dismissed by the umpire. During the year the joint commission disposed of 71 claims—7 by awards, 1 by dismissal on claimant's motion, 17 because of lack of jurisdiction, 22 on presentation of evidence that payments were made on direct settlement, 5 on account

of previous award having been made for the same property, 9 were dismissed because of lack of merit, and 10 were dismissed under the commission's rule of default.

On June 30, 1920, there were 58 lot licenses in effect on the Canal Zone, issued by the land agent on behalf of The Panama Canal; of this number, 7 were issued during the fiscal year. The revenue collected on these licenses for the year aggregated \$16,290.02.

For further details see Appendix H.

HEALTH DEPARTMENT.

This department remained under the jurisdiction of Col. H. C. Fisher, United States Army, as chief health officer. The general health conditions of the Canal Zone and of the cities of Panama and Colon remained normal, except for the prevalence of an influenza epidemic which began early in the month of March, 1920. From this disease there were 601 cases and 50 deaths in March, 314 cases and 52 deaths in April, 40 cases and 24 deaths in May, and 138 cases and 7 deaths in June. The epidemic originated in the city of Colon, but later cases were reported from all parts of the Canal Zone and the city of Panama and its suburbs. Effective measures were taken to control the epidemic so far as possible. Schools, moving picture shows, and other places of assembly were closed for a period of two weeks. On March 21, 1920, a ship from Ecuador was received at Balboa quarantine with six cases of influenza. On June 23 a ship from Peru arrived with 23 cases. In both instances the local passengers were detained in quarantine three days and the crew and other agents and employees were observed and temperatures taken for three days; no new cases developed from these sources.

There were 28 cases of smallpox reported during the year, with no deaths. Among residents of the cities of Panama and Colon a systematic vaccination was continued. On June 30, 1920, there were two cases in the hospital. One case of yellow fever was reported to the Balboa quarantine on August 10, 1919, from a ship arriving from Corinto, Nicaragua. There were no secondary cases following this case, and no cases of yellow fever originated on the Isthmus; 11 cases of leprosy were admitted to the leper asylum during the year.

With the cooperation of the chief health officer an antivenereal disease campaign has been conducted along the lines adopted in the United States by the Commission on Training Camp Activities of the War and Navy Departments. A free venereal disease clinic, where both curative and prophylactic treatments are given, was established in Santo Tomas Hospital, in Panama, on August 19, 1919, and one at Colon on March 1, 1920, maintained by the American National Red Cross. An educational campaign has been conducted; pamphlets have been distributed in English and Spanish, and moving pictures dealing with this subject shown. A notice of warning against all prostitutes was handed by the quarantine officers to the crews of all incoming vessels. On account of the inevitable lack of authority to legislate in foreign territory, the recommendations and suggestions of the chief health officer and his assistants have been of an advisory character only, so far as the cities of Panama and Colon are concerned.

In the population of the Canal Zone and vicinity the incidence of malaria was less than in the preceding year, the number of cases reported having been 1,370 for 1920, as compared with 2,224 in 1919. The annual rate per thousand for employees living in the sanitated areas of the Canal Zone and the two terminal cities was 14.64 in 1920, as compared with 10.81 in 1919. In the unsanitated districts, camps, and plantations within the Canal Zone the rate per thousand was 169.13 in 1920, as compared with 240.53 in 1919.

Among the employees of the Canal and Panama Railroad the death rate per thousand for 1920 from all causes was 9.49, as compared with 8.43 in 1919. The death rate from tuberculosis was 1.43, as compared with 1.49 in 1919. The five diseases causing the highest number of deaths, with the rate, are as follows: Tuberculosis, 1.43; pneumonia, 1.15; influenza, 0.97; chronic nephritis, 0.87; organic diseases of the heart 0.46.

In the average population of the Canal Zone of 30,954, including the military population, there were 253 deaths, 219 of which were from disease, with a rate of 7.08 per thousand for disease alone, as compared with 9.4 in 1919.

In the city of Panama there were 1,278 deaths, of which 1,234 were from disease, giving a rate of 20.11 for disease alone, as compared with 21.85 for the preceding year, on the basis of an average population of 61,369. In Panama City the death rate from tuberculosis was 3.8 per thousand, as compared with 4.3 for the year 1919. Of the total deaths reported in the city of Panama 42 per cent occurred among children under 5 years of age.

In the city of Colon there were 567 deaths, of which 527 were from disease, giving a death rate of 20.21 from disease alone, as compared with 23.28 the preceding year, on the basis of an average population of 26,078.

* DIVISION OF HOSPITALS.

Ancon Hospital.—At the surgical clinic there were performed 1,944 major operations; 3,134 cases visited the out-patient department; 314 obstetrical cases were delivered. In the medical clinic 2,611 cases were treated in the out-patient department. In the eye and ear clinic 7,443 cases were examined in the out-patient department. A total of 2,606 prescriptions were written, 967 refractions were made, and 976 operations performed. In the X-ray clinic a total of 3,333 cases were handled; 7,197 plates and 1,708 dental films were taken. In the steward's department there were 164,218 rations issued to Ancon hospital patients and 92,790 rations to hospital employees, making a total of 257,008 rations issued. A total of 10,393 patients were admitted. At the board of health laboratory the work included examinations of milk, beverages, drugs, canned foods, and miscellaneous supplies, as well as clinical examinations requiring quantitative determination. The entomological department of this laboratory covered the study of insects infesting food and stored products, household insects, vegetables and truck crop insects, and the more important pests of tropical fruit trees. At the request of the United States Department of Agriculture the laboratory facilities were made available to an entomological inspector of the Federal Horticultural Board, who was assisted by the chief of laboratory. The principal object in view was to ascertain what dangerous pests occur in the Canal Zone which might, on account of the concentration

of traffic and commerce from all parts of the world, be potential menaces to the continental United States.

Corozal Hospital.—On June 30, 1920, there were 344 patients and 26 chronic cripples at the Corozal Hospital. In the treatment of the insane the occupational department was expanded. The officers of the Mental Hygiene Society in New York sent down free of charge an industrial instructor, who remained here three months and instructed the chief nurse in the essentials of an industrial department. The occupational treatments proved to be beneficial to the class of insane patients at this hospital. Most of the articles made by the patients, including rugs, hats, handbags, wood carving, etc., have found ready sale. Most of the male patients are cultivating gardens attached to the hospital plant. From appropriations made by Congress a new hospital ward was erected, with accommodations for 80 patients, and was occupied in January, 1920. It has been possible to isolate all tubercular insane patients. The grounds within the hospital have been kept in order by patients' help. The dairy maintained at this hospital was continued and milk supplied, under prescription, to the patients in Ancon Hospital. On June 30, 1920, the herd consisted of 3 bulls, 74 cows, and 38 calves. At the piggery there were on hand at the end of the year 27 hogs and 120 pigs. Most of the pigs when ready for use are sold to the supply department. The number of cripples remaining at the hospital on June 30, 1920, was 4 white and 27 black, a reduction of 21 during the year.

Colon Hospital.—Emergency cases are admitted to the Colon Hospital; others, both medical and surgical, are transferred to the Ancon or Santo Tomas Hospitals. Efforts were made to keep the number of patients in Colon Hospital to 50 or below. The number of admissions at this hospital during the year were as follows: Employees, 305; Army and Navy, 88; Panama pay patients, 5; other pay patients, 427; charity patients, 62, making a total of 887. A total of 403 surgical operations were performed at this hospital.

Santo Tomas Hospital.—This hospital, located in the city of Panama, is owned by the Panaman Government, but is operated by agreement under the general supervision of the chief health officer of the Canal. The superintendent, two physicians, and three nurses are employees of the Canal. With the cooperation of the Panaman Government a practical system of bookkeeping and property accounting has been installed, and a systematic survey of the financial condition was made. All of the debts of the institution have been paid. From revenues pertaining to the Republic of Panama, derived from liquor taxes and the national lottery, plans have been made and approved and construction commenced on an entirely new hospital plant. The site of the new plant is on a high point facing the Pacific Ocean, in the suburbs of the city of Panama. The estimated cost of the total project is \$1,000,000. The total capacity of the hospital will be 600 patients under normal conditions, with facilities for emergency expansion to 900 patients. The following equipment and facilities are being installed at the institution: Sound-proof walls, silent bell call system; floor lights and inclosed clothes chutes; an X-ray suite; library and class room; venereal and dental clinics. A radium department will be a feature of the surgical suite, and hydro and electric therapeutic installations will also be added to the institution.

Palo Seco Leper Asylum.—The number of cases in this institution at the close of the year was 74. There were 11 admissions and 39 were discharged—2 from Gatun, 1 from Empire, 4 from Panama, and 1 from Juan Diaz, in the Republic of Panama. Three deaths occurred during the year. Two patients were paroled who were afflicted with a noninfectious type of leprosy; they will report to the health department once every six months for examination and report as to condition. One patient was deported to his home in Martinique and 1 to Barbados.

SANITATION.

The principal work of the division of sanitation consists in anti-mosquito work. The four sanitary districts remain as described in last year's report except that the former Army post at Las Cascadas, on the west side of the Canal, is now sanitized by our forces as this town was turned over to the Canal and opened by the supply department for silver employees of the Canal. On account of an outbreak of malaria in Colon and Mount Hope and vicinity, drainage ditches extending to sea level were excavated in swamps on Telfer's Island and in the vicinity of Mount Hope. All swampy territory within a mile of the dry dock was thus drained. Drainage work was also done in the vicinity of Gatun, in a swamp north of Gatun dam and west of the old French canal. Near Pedro Miguel tile drainage was installed in the fortifications clearings formerly used as cattle pastures. In the Ancon-Corozal district the outlying areas requiring maintenance by oiling and other temporary measures have been improved by the construction of open ditches lined with half-round concrete drains. No extensive construction was required in the Balboa district. Constant vigilance was exercised to reduce so far as possible the number of rats in the vicinity of dwellings, store-houses and steamship piers. Systematic rat destruction was carried on in the terminal cities by poison and traps, and examinations were made by the board of health laboratory in all cases to determine if any plague infection was present. Because of the prevalence of plague in both North and Central American ports, the destruction of rats is an important protective measure in the Canal Zone against the importation and spread of plague.

QUARANTINE DIVISION.

Inspection trips were made by the chief quarantine officer and by the quarantine officer at Cristobal to various ports in Central and South America in order to discover the actual conditions as to the incidence of yellow fever and plague at those ports. As a result of these inspections the 6-day quarantine was lifted against the Atlantic ports of Colombia. Fumigation of all vessels arriving from the west coast of South America, which discharged cargo at a Canal Zone port, was continued, and these vessels are fumigated, empty, once every three months for the destruction of rats. On account of the unsatisfactory plague situation at Paita, Peru, the separate fumigation on the arrival at Cristobal of all cargo lifted at this port was instituted as a matter of precaution. Steamship companies have given hearty cooperation in these protective measures. Quarantine

inspection of incoming vessels from "clean" ports, at the Balboa entrance up to 10 o'clock at night, was started on February 16, 1920. Up to June 30, 1920, only 9 ships had availed themselves of this privilege. At Cristobal 203 ships were inspected at night. The quarantine service is charged with the enforcement of immigration regulations of the Canal Zone and Republic of Panama, aided in cases of American seamen and Chinese by the customs bureau.

For further details see report of chief health officer, Appendix I.

WASHINGTON OFFICE.

This office remained in charge of Mr. A. L. Flint, as general purchasing officer and chief of office. The work is divided into three general subdivisions; Administrative office, including the appointment division and the correspondence and record division; office of the assistant auditor; and the purchasing department. The work of the appointment division was affected by unusual conditions during the year, including the shortage of skilled and technical men in the United States available for appointment on the Canal; interruption of sailing schedules to the Isthmus during the summer and autumn of 1919, and the loss during the year of most of the experienced clerks engaged in this work.

On May 5, 1920, a requisition was received from the Isthmus for 130 building tradesmen. Forty-two per cent of those tendered appointments during the year failed to accept. Seventeen hundred and ninety-two persons were tendered appointments in the grades above that of laborer, of which 1,032 accepted and were appointed. Four thousand five hundred and ninety-two persons, including new employees, those returning from leaves of absence, and members of employees' families, were provided with transportation from the United States to the Isthmus. In response to inquiries and applications for employment, and in the issuance of appointments, 21,435 letters were written; 7,525 telegrams were sent, and 43,222 circulars were mailed.

The increasing commercial use of the Canal since the war has developed a corresponding increase in the work of the correspondence and record division in answering inquiries and disseminating general information and literature regarding the Canal.

In the assistant auditor's office 13,635 disbursement vouchers, amounting to \$8,180,673.25, and 225 collection vouchers, amounting to \$1,678,875.44 were prepared. An administrative examination was given 1,661 settlements by transfer of appropriations, aggregating \$2,106,758.79. Reports were made on 31 claims submitted to the auditor for the War Department. One hundred and twenty-one contracts were prepared, amounting to \$5,130,714.76. The assistant auditor, as legal adviser in the United States for The Panama Canal, has continued to render assistance to the Department of Justice in connection with the preparation for trial, and at the trial in the courts, of all cases in connection with actions brought by or against The Panama Canal. During the year suits have been pending against The Panama Canal involving claims amounting to \$19,339.48. All cases were settled in favor of the Government except one, which is still pending in the district court of the seventh district, New York.

The purchasing department issued 8,367 orders for material and supplies, an increase of 898 as compared with the fiscal year of 1919. The total value of the orders placed was \$9,133,069.94, as compared with \$6,764,278.82 for the fiscal year 1919. Sales in the United States of scrap and obsolete Canal material handled by the purchasing department during the year amounted to \$678,402.82, based on 58 sale orders, as compared with \$423,194.90, based on 70 sale orders during the preceding year.

The work of inspection of material purchased has been facilitated as heretofore by assistance of the field officers of the Corps of Engineers, United States Army, in charge of districts, by the Bureau of Standards, Bureau of Mines, Bureau of Chemistry of the Department of Agriculture, and the Medical Department, Ordnance Department, Signal Corps, and Quartermaster Corps of the United States Army.

The principal purchases were made by the Washington office, although offices in charge of assistant purchasing agents have been continued at New York, New Orleans, and San Francisco. These offices act as receiving and forwarding agents for such material as has been purchased in their respective ports. A small force of employees has been continued in the medical branch, Zone Supply Office, United States Army, to assist the officers in charge in making purchases of medical and hospital supplies on the Isthmus, most of which have been purchased through that branch.

For further details of the operations of this office, see report of general purchasing officer and chief of office, Appendix J.

Respectfully submitted.

CHESTER HARDING,
Governor, The Panama Canal.

HON. NEWTON D. BAKER,
Secretary of War, Washington, D. C.

APPENDIX A.
REPORT OF THE ENGINEER OF MAINTENANCE.

THE PANAMA CANAL,
OFFICE OF THE ENGINEER OF MAINTENANCE,
Balboa Heights, Canal Zone, July 20, 1920.

SIR: The following is a report of the work done under the jurisdiction of this office during the fiscal year ending June 30, 1920:

ORGANIZATION.

The duties of the engineer of maintenance were increased during the year by the issuance of your order dated August 15, 1919, instructing me to have supervision over the work of the building division. During the year the personnel in charge of the various divisions and sections reporting to this office was as follows:

Building division.—Mr. Hartley Rowe resigned, effective August 15, 1919, and Mr. T. C. Morris was appointed resident engineer in charge of the building division.

Electrical division.—Mr. Walter L. Hersh, electrical engineer.

Locks division.—Mr. E. D. Stillwell, superintendent of the Atlantic locks.

Mr. W. R. Holloway, superintendent of the Pacific locks.

Municipal division.—Mr. D. E. Wright, municipal engineer.

Section of meteorology and hydrography.—Mr. R. Z. Kirkpatrick, chief hydrographer.

Section of office engineer.—Mr. C. J. Embree, office engineer.

Dredging division.—Mr. J. M. Pratt, superintendent.

Section of surveys.—Mr. O. E. Malsbury, assistant engineer.

Maintenance of Gatun dam and back fills.—Mr. J. J. Walsh, general foreman.

LOCKS DIVISION.

OPERATION.

On July 25 the largest American ships to transit the Canal went through Gatun locks going south. They were the dreadnaughts *New Mexico* and *Mississippi*, sister ships of 32,000 tons each, length 624 feet and beam 97 feet 4½ inches.

The largest ship to transit the Canal to date is the British battle cruiser *Renown*, which passed through the Canal on March 30, 1920, with the Prince of Wales. She has a length of 795 feet and a displacement of 33,379 tons, her beam being 91½ feet.

LOCKAGES.

The following table gives the record of lockage operations for the past fiscal year:

	Gatun.	Pedro Miguel.	Miraflores.
<i>Lockages.</i>			
Commercial lockages:			
Vessels.....	2,290	2,360	2,289
Panama Railroad vessels.....	14	17	15
Launches.....	6	5	4
Total commercial lockages.....	2,310	2,382	2,308
Noncommercial lockages:			
Canal.....	77	292	243
U. S. Navy and U. S. Army.....	172	185	180
Total noncommercial lockages.....	249	477	423
Commercial lockages in which noncommercial vessels were included.....	175	234	262
Summary:			
Commercial lockages.....	2,310	2,382	2,308
Noncommercial lockages.....	249	477	423
Total lockages.....	2,559	2,859	2,731
<i>Vessels.</i>			
Commercial vessels.....	2,498	2,507	2,508
Commercial launches.....	36	20	20
Total commercial vessels and launches.....	2,534	2,527	2,528
Noncommercial:			
Vessels (canal).....	1	93	85
Barges (canal).....	93	123	108
Tugs (canal).....	115	306	287
Launches (canal).....	56	129	126
Noncommercial U. S. Army and U. S. Navy:			
Vessels.....	258	284	283
Barges.....	16	9	11
Tugs.....	43	27	27
Launches.....	32	32	51
Total noncommercial vessels, etc.....	614	10,003	978
Summary:			
Commercial vessels.....	2,534	2,527	2,528
Noncommercial vessels.....	614	1,003	978
Total vessels.....	3,148	3,530	3,506

The average number of lockages per month for Gatun was 213.25 as compared with $180\frac{1}{2}$ for last year. The average number of lockages for the Pacific side was 238.25 as compared with $203\frac{2}{3}$ last year. The month having the maximum number of lockages and vessels was December, 1919, when the record was as follows:

	Atlantic locks.	Pacific locks.
Commercial lockages.....	252	259
Noncommercial lockages.....	16	32
Total number of lockages.....	268	291
Commercial vessels.....	269	266
Noncommercial vessels.....	43	75
Total number of vessels.....	312	341

WATER CONSUMPTION—GATUN LAKE.

Complete data regarding the hydrography of Gatun Lake for the calendar year are included in the report of the chief hydrographer given hereinafter. The following table has been compiled to give complete information regarding the average monthly supply and demand of water for the past fiscal year:

Average quantity of water per month.

	Cubic feet.	Percentage.	Percentage of total.
Water lost:			
Loss in storage, Gatun Lake.....	879,790,000	10.4786	6.4882
By evaporation.....	1,994,150,000	23.7511	14.7062
By wastage over Gatun spillway.....	5,433,670,000	64.7172	40.0717
By leakage, Gatun spillway.....	9,500,000	.1132	.0700
By transfer to Miraflores Lake.....	31,700,000	.3776	.2338
By leakage, all locks.....	47,210,000	.5623	.3482
Total water lost.....	8,396,020,000	100.0000	61.9181
Water used:			
For pumping.....	74,650,000	1.4456	.5505
For lockages, Atlantic.....	857,900,000	16.6135	6.3268
For lockages, Pacific.....	745,310,000	14.4332	5.4964
For hydroelectric station.....	3,486,000,000	67.5077	25.7082
Total water used.....	5,163,860,000	100.0000	38.0819
Total water lost and used.....	13,559,880,000	.....	100.0000

The maximum lake elevation for the year was 87.16 feet in December, the average 84.85 feet, and the minimum elevation of Gatun Lake was 81.65 feet in May of this year. As detailed in the report of the chief hydrographer, water was conserved in Gatun Lake by a partial relief of the hydroelectric station through operation of the Miraflores steam station. The controlling reason for this was the acute situation at Cucaracha slide from February 22 to early in June, during which time, as was anticipated, the gains in levels effected by this saving of water facilitated the transit of some of the larger ships.

PAINTING AND MAINTENANCE.

In line with the adopted policy of maintenance of underwater structures by unwatering at three-year intervals, maintenance at Miraflores locks started with the installation of the floating caisson in the east chamber on December 12, the work being completed January 31. The west chamber was unwatered February 2 and the work completed February 7. Work was started at Pedro Miguel west chamber February 12 and completed March 27. The east chamber at Pedro Miguel was not overhauled because of the congested traffic conditions in the short stretch of the Canal north of Pedro Miguel due to the emergency brought about by conditions at Cucaracha slide.

During the maintenance work it was found that the teredo has attacked the greenheart sill timbers of the gates. New sills were installed on gates 120, 121, 123, 124, 108, 109, and 113 at Miraflores locks. The teredo was also found attacking the greenheart sills in the west chamber at Pedro Miguel locks, where the fresh water of Gatun Lake passes into Miraflores Lake, the latter 54½ feet above sea level.

TOWING LOCOMOTIVES.

The towing locomotives have continued to render excellent service throughout the year. All locomotives were thoroughly overhauled and painted, the slip drums being tested at varying intervals, but a test is made at least once every two weeks. Only one accident occurred during the year when one of the machines went down the incline under the emergency dam at Pedro Miguel and collided with another machine, injuring one cab.

TRANSFORMER ROOMS.

In the transformer rooms all oil switches are tripped at least once a week for test.

The oil switch banks have been thoroughly overhauled, the relays checked, the busses retaped where necessary, and the oil in oil switches and transformers has been filtered. Steps have been taken to install disconnective switches on all towing track feeders at Gatun to assist in operation.

MITER GATES.

All miter gates are sounded each week and necessary repairs made. The control piping leading through to the air compartment has been rusting badly and orders have been issued to remove all miter gates sump pumps and their respective control piping.

We have continued to maintain the bitumastic enamel on the interior and exterior of the lock gates, the American Bitumastic Enamels Co. guarantee having expired at all locks except Miraflores, where the painting of the exterior of the gates is still under guarantee.

RISING STEM VALVES.

During the maintenance of Miraflores and Pedro Miguel locks the rising stem valves were removed and completely overhauled. The side seal strips of guayacon were found badly eaten by teredos and the bottom seals of greenheart were in the same condition.

The wearing pads and roller trains of all valves were found to be in bad condition and in many cases will have to be replaced on the next overhauling. In some cases the bronze nuts on the rising stems have worn down to a point where they sheared off in service; the depth of the sheared thread on one set was found to be about one-sixteenth inch at the base, the original thickness being one-half inch.

CYLINDRICAL VALVES.

All leather seals on the cylindrical valves of the Pacific locks are being removed and replaced with rubber. The balance of the valves have been maintained in fair condition by the bituminous enamel applied during the last maintenance period.

CULVERT SCREENS.

When the maintenance work at Miraflores locks was started it was found that the intake screen on valve No. 406 had passed through the culvert and was found on the caisson seat at the lower end of the

locks. The culvert and valves were examined and no apparent damage was done by the screen in its travel through the culvert. Several other screens were found so badly bent that they could not be lifted through the bulkhead slots, but had to be pulled out through the end of the culvert.

EMERGENCY DAM.

The usual maintenance of the emergency dams has been carried on, the dams at Gatun being repainted in March. We have continued to operate each pair of dams at all locks once each month, one dam being operated at night and one in the daytime. Two quadrants were found to have settled, the east one at Miraflores and the west one at Pedro Miguel. As the quadrants were found to be as much as 1½ inches out in places, it was necessary to take up all rack castings, pull the foundation bolts, and reset the entire set of quadrant castings of the dams mentioned.

FENDERS.

The wooden fenders installed along the approach walls of all locks have begun to deteriorate due to dry rot, they are being replaced at present with native hardwood almendra. The marine division considered it necessary to install a third and lower set of fender timbers at lower Miraflores locks to take care of extreme low tide conditions. The new fenders were put in by the building division, the work being completed November 7, 1919.

TRANSPORTATION.

A 1-ton Ford truck has been added to the equipment of the Pacific locks and will be used to handle supplies from the storehouse as well as carrying men to Miraflores locks when the launch is out of commission. A new railroad speeder has just been delivered and will be used for handling heavy material between Corozal storehouse and Miraflores locks.

Following are extracts from reports of the lock superintendents, covering details of operation and maintenance of the locks.

PACIFIC LOCKS.

ORGANIZATION AND PERSONNEL.

There were few changes in the personnel, but the general organization remained the same as throughout the previous year with the exception of the addition of two supervisors and additions in some of the minor positions, all of which are covered below.

Mr. W. R. Holloway continued as superintendent throughout the year, with Mr. J. C. Myrick as assistant superintendent. Mr. D. H. Moore was promoted from assistant mechanical supervisor to the newly authorized position of mechanical supervisor, and Mr. Oliver Bullock was promoted from assistant electrical supervisor to the newly authorized position of electrical supervisor, both promotions being made effective May 16, 1920. Mr. R. S. Mills and Mr. A. E. Meigs continued in the other two positions of electrical supervisor and mechanical supervisor, respectively, throughout the year.

Due to the increase in traffic it was found necessary to increase the gold organization by two control house operators—one each for Pedro Miguel and Miraflores locks. The gold organization was also increased by the addition of one utility foreman.

Approximately 47 per cent of the silver force joined the strikers in the strike that commenced on February 24, 1920. Twenty-six per cent of the strikers returned to work, and by taking on new men the silver force was back to normal in one month. There was no delay to shipping on account of the strike.

OPERATION.

Operations were continued throughout the year on a two-shift basis, covering a period from 7 a. m. to 6 p. m., at Pedro Miguel locks and from 7 a. m. to 8.30 p. m., at Miraflores locks. It has been found necessary at times to hold the men beyond the regular working day, but the above hours take care of traffic under normal conditions.

Tabulations are attached showing lockages by months for both Pedro Miguel and Miraflores locks, and a tabulation is also attached showing the total lockages for the year. There was an increase in lockages of 16 per cent at Pedro Miguel and 17 per cent at Miraflores locks over the number for the last fiscal year.

There were no delays to traffic due to failure of the operating machinery.

Practice operations of the emergency dams were made monthly, but no emergency operations were necessary.

The spillway at Miraflores was operated to maintain Miraflores Lake at the proper elevation, which is 54 feet above sea level.

PAINT MACHINE.

The paint machine was operated throughout the year, approximately 3,000 gallons of paint being manufactured for the Atlantic and Pacific locks.

LAUNCHES AND BOATS.

The launches *Mary S* and *Dora V* were operated on Miraflores Lake for transporting men and material back and forth between Pedro Miguel and Miraflores locks. The launch *Mary S* was given a complete overhauling during the year.

Two round-bottom pilot boats were made during the year, this work being done by the lock forces.

COROZAL STORE.

The storehouse was operated at Corozal throughout the year in connection with the storing and issuing of spare parts for the Atlantic and Pacific locks.

MISCELLANEOUS.

A Ford truck was secured for service in connection with handling material and supplies for the locks, and a motor car was also secured for operation on the branch line between Corozal and Miraflores locks.

Towing locomotive No. 667 was damaged in a collision with locomotive No. 670 at Pedro Miguel locks. It was necessary to install a new cab on locomotive No. 667 and also to install new panels and controller. All work was done by the lock forces with the exception of the building of the cab, which work was done by the mechanical division at Balboa shops.

Low-tide fenders were installed on both sides of the south approach wall at Miraflores locks, extending from the chains to the end of the wall. The construction of these fenders consists of a single row of 12 by 12 inch timbers, 7 feet below the lower section of the original fenders. This work was done by the building division.

Work was started by the lock forces installing a single row of fenders from the chains to the outer gates at both ends of Pedro Miguel and Miraflores locks, on the center walls. This work has been completed at the north end of Pedro Miguel locks.

Inspection of the emergency dam quadrants showed that it was necessary to adjust the quadrant of the east dam at Miraflores locks and both dams at Pedro Miguel locks. All this work was completed during the year.

MAINTENANCE.

The floating caisson was given a complete overhauling. In connection with this work new impellers were installed in all pumps.

The spillway caisson was also given an overhauling. It was necessary to renew the bottom sill in its entirety, as well as to install a new roof. The caisson was also coated with bitumastic enamel.

The fender timbers at both sets of locks were inspected and renewed where necessary.

The soft nose at the north end of Pedro Miguel locks was overhauled.

The east chamber at Miraflores locks and the west chamber at Pedro Miguel locks were unwatered in order to give the submerged parts an overhauling and for touching up the bitumastic on the gates and valves. This work is covered in detail below.

OVERHAULING AT MIRAFLORES.

The caisson was sunk at the lower end of the east lock on December 12, 1919. The overhauling was completed and the caisson raised on January 23, 1920. The caisson was then sunk in place at the upper end of the same lock on January 26, 1920, to expose the upstream and bottom surfaces of the upper gates. This work was completed and the caisson raised on January 31, 1920. The caisson was then sunk at the upper end of the west lock on February 2, 1920, to expose the upstream and bottom surfaces of the upper gates, and was floated again on the completion of this work on February 7, 1920. The general condition of the submerged parts as found on unwatering the locks and the report of maintenance work done on them are covered under each item. This work was all done by the lock forces.

Miter gates.—The bitumastic enamel on the submerged surfaces was generally spotted from rust on the exterior of the gates. On the four lower gates (Nos. 120, 121, 124, and 125) a heavy barnacle growth was found. This growth was scraped off and it was then found necessary to re-cover the entire submerged surface with new enamel. The exterior surfaces of the other gates were then gone over and all rust spots cleaned and scraped, after which the spots were touched up with new enamel.

On the south side of the interior of gates Nos. 117, 116, 120, and 121 the heat had caused the enamel to soften and run, leaving a very thin coat. The interior surfaces of these gates were reenameled where the coat had become thin, and the remaining surfaces on the interior, as well as the interior surfaces of all other gates, were carefully gone over and rust spots cleaned and scraped, after which they were touched up with new enamel.

Hermastic enamel was used on all exterior surfaces in the east lock and on the interior of gates Nos. 108, 116, 117, 120, and 124. Barber asphalt was used on all other interior surfaces. The exterior surfaces of gates Nos. 102 and 103 were patched with Navy enamel.

The conduit and pipes for the sump pumps in the gates were found to be badly corroded in all gates, and in some practically eaten through. All sump pumps, conduit, and pipes, except sounding tubes, were removed from the gates, and the holes where the pipes had passed through the water-tight bulkheads were plugged.

Some of the greenheart seals at the bottom of the gates were damaged by the teredo. The seals were repaired at nine gates, 180 linear feet of 12 inch by 12 inch almendra timber being used to replace the worm-eaten timbers that had been taken out.

Three hundred and thirty linear feet of the oak fenders at the tops of the gates that were weakened by decay were replaced with almendra.

Rising stem valves.—The bitumastic enamel was in fair condition except on the rivet heads, butt straps and top seal castings. The four lower valves were covered with barnacles. The bottoms of the valves were badly pitted. The rivet heads were partly eaten away, weakening their tensile strength. The wearing pads on the valves were badly pitted. A number of the side seal springs were broken. The end rollers were nearly all stuck fast and had "flats" worn on them. The lignum-vitæ side seal and bottom seal strips had been damaged by the teredo. The roller trains were generally in bad condition, the rollers being pitted with rust and reduced in size. The rollers were very loose in their bearings, due to wear and corrosion, reducing the diameter of the shaft and enlarging the bearings. The fixed irons in the culvert were badly corroded, especially the roller train and end roller tracks.

Twelve valves were overhauled at this time. The valve machines were dismantled and the valves lifted out for overhauling. The bottom seals of all valves were planed to a true surface. Two hundred and twenty-one defective rivets were backed out and new rivets driven. All broken side seal springs were renewed. The end rollers were turned in the lathe to eliminate "flats" and then shimmed out when mounted. The lignum-vitæ side seal and bottom seal strips were renewed with strips of the same material that had been impregnated with cresote. The roller trains had to be practically rebuilt, straight iron bars being used in place of channels for the containers. Several top seal castings and seals were repaired. The fixed irons in the culvert were scraped and cleaned, after which they were coated with hermastic enamel. The bearing surfaces were greased. The barnacles were scraped off the four lower valves and these valves were then recoated. All rivet heads and other exposed parts were patched with enamel.

Cylindrical valves.—When the chamber was unwatered it was found that the rubber seals installed on the valves on the west side had practically eliminated leakage. Rubber seals were installed on the 20 valves on the east side. The valves were found to be in very good condition except the leather seals, which were very hard and badly deteriorated. The enamel was in good condition. Necessary touching up

was done. There was very little rusting or pitting on any part of the valves. A few bolts, nuts, and cap screws were renewed. The stems were repacked on all the valves on the east side.

Guard valves.—The screens for guard valves Nos. 407 and 408 were removed on December 9, 1919. It was necessary to do considerable repair work on both of them due to rivet heads and spacers being eaten away. The screen for No. 406 had collapsed and had been washed through the culvert, lodging on the caisson seat at the lower end of the locks. No damage was done to the valves or culvert in its passage. The screen was sent to Balboa shops and available parts were used in building a new screen.

The opening in front of valve No. 407 was not wide enough to take a bulkhead, so the valve was replaced on December 10, 1919, after having been overhauled. The side seals were overhauled, and the roller trains were in good condition and were replaced. The end rollers were overhauled, the bottom planed and the valve coated with Navy enamel.

On valve No. 406 the bottom seal was planed, end rollers overhauled, slide seals overhauled and scraped and the valve coated with hermetic enamel. Rebuilt roller trains were installed. The valve was replaced on January 2, 1920.

Valve No. 408 was removed on January 6, 1920. The valve and roller train were rusty but not badly pitted. Rebuilt roller trains were installed. The side seals were overhauled, as well as the end rollers, and the valve was then coated with hermetic enamel. It was replaced on January 21, 1920.

The roller trains for the guard valves covered above were in very good condition. They were all rusty but were not badly pitted and the roller bearings were not badly worn. Roller trains Nos. 406 and 408 were used on the rising stem valves and rebuilt trains installed in their place.

Bulkheads.—Bulkheads were installed in the upper end of the east culvert on December 9, 1919, and in the lower end on December 12, 1919. The bulkheads at the upper end were removed on January 23, 1920, and the lower end on January 24, 1920.

The center culvert entrance bulkheads were removed in both the upper and lower chambers and seals renewed complete, almendra being used. The enamel on these bulkheads was in very good condition and touching up only was done.

OVERHAULING AT PEDRO MIGUEL.

The caisson was sunk at the lower end of the west chamber at Pedro Miguel locks on February 11, 1920. It was floated again on March 25, 1920, after completion of the overhauling work in that chamber. The general condition of the submerged parts, as found on inspection after the lock was unwatered, and a report of the maintenance work on them are covered under each item.

Miter gates.—The exterior surfaces of these gates had been coated with Navy enamel in the early part of 1917, and touching up only was required at this time. The exterior surfaces were in very good condition and showed no signs of deterioration except on the miter faces and at the quoins, which showed considerable corrosion and pitting. These were thoroughly cleaned and given one coat of red lead paint and a heavy coat of "Crater" compound. The bitumastic on the interior of gates Nos. 64, 65, 72, and 73 was touched up.

It was found that the teredo had been extremely active in all gate sills. The sills for gates Nos. 68 and 69 were renewed in their entirety, 25 linear feet of the sill at the quoin end of No. 72, and 12 feet each at the miter ends of Nos. 72 and 73 were renewed. Almendra was used on all this work.

Repairs were made to the fenders at the tops of the gates, 96 linear feet of fenders being renewed.

Rising stem valves.—All center wall rising stem valves, with the exception of Nos. 312 and 313, and all the west side wall valves were removed for overhauling. All end rollers had to be removed, overhauled, and refined. The rivets in the valves were in good condition. A number of the side seal springs were broken, and valve No. 330 required a complete set of new springs. Some of the roller trains were worn and had to be replaced. The bottoms of the valves were planed to a true surface where necessary.

Before the valves were replaced they were thoroughly cleaned and the bitumastic gone over. Some of the valves required an entire new coat of bitumastic.

Cylindrical valves.—The cylindrical valves were in good condition. The leather seals were replaced with rubber seals on all valves of the west chamber. The bitumastic on all valves of the west chamber was touched up.

Guard valves.—The screens were bent out of shape and had to be pulled through the intake openings with a towing locomotive. They were then sent to Balboa shops to be used in connection with making new screens. The guard valves were all in good condition. However, they had never been coated with bitumastic and had to be taken out for this purpose.

The roller trains for guard valves Nos. 309 and 311 were used on the rising stem valves, rebuilt trains being installed in their place.

Pedro Miguel Locks.

LOCKAGES.

Months.	Northbound.				Southbound.				Total both ways.
	Com- mer- cial.	Army and Navy.	Canal equip- ment.	Total.	Com- mer- cial.	Army and Navy.	Canal equip- ment.	Total.	
1919.									
July.....	90	11	14	115	68	43	20	131	246
August.....	99	2	5	106	90	20	13	123	229
September.....	100	0	11	111	76	6	18	100	211
October.....	123	1	12	136	77	11	14	102	238
November.....	92	1	5	98	87	10	16	113	211
December.....	115	5	7	127	144	6	14	164	291
1920.									
January.....	119	2	9	130	107	12	16	135	265
February.....	93	7	15	115	84	11	9	104	219
March.....	95	2	9	106	101	4	17	122	228
April.....	105	6	9	120	107	4	13	124	244
May.....	117	3	9	129	102	7	12	121	250
June.....	91	2	10	103	100	9	15	124	227
Total.....	1,239	42	115	1,396	1,143	143	177	1,463	2,859

VESSELS.

1919.									
July.....	95	16	41	152	68	62	36	166	319
August.....	100	6	13	119	90	33	24	147	267
September.....	100	1	31	132	77	12	31	120	252
October.....	123	2	29	154	78	20	27	125	279
November.....	92	8	19	119	92	17	28	137	256
December.....	120	6	22	148	146	12	35	193	341
1920.									
January.....	126	5	22	153	116	27	30	173	326
February.....	109	18	38	165	101	28	24	153	318
March.....	112	7	23	142	127	15	32	174	316
April.....	113	10	27	150	116	9	22	147	297
May.....	120	6	24	150	105	15	24	144	294
June.....	97	5	25	127	104	12	24	140	257
Total.....	1,307	90	314	1,711	1,220	262	337	1,819	3,530

THE PANAMA CANAL.

Miraflores Locks.

LOCKAGES.

Months.	Northbound.				Southbound.				Total both ways.
	Com- mer- cial.	Army and Navy.	Canal equip- ment.	Total.	Com- mer- cial.	Army and Navy.	Canal equip- ment.	Total.	
1919.									
July.....	84	10	14	108	67	42	17	126	234
August.....	92	2	6	100	85	19	13	117	217
September.....	93	0	12	105	72	5	19	96	201
October.....	118	1	11	130	76	10	13	99	229
November.....	92	1	4	97	83	10	13	106	203
December.....	108	5	5	118	124	6	9	139	257
1920.									
January.....	110	2	7	119	91	11	12	114	233
February.....	96	7	10	113	92	10	1	103	216
March.....	96	2	4	102	107	4	13	124	226
April.....	104	7	8	119	102	4	15	121	240
May.....	115	3	8	126	101	8	10	119	245
June.....	96	2	8	106	104	9	11	124	230
Total.....	1,204	42	97	1,343	1,104	138	146	1,388	2,731

VESSELS.

1919.									
July.....	96	16	33	145	69	62	33	164	309
August.....	100	6	12	118	90	33	23	146	264
September.....	99	1	31	131	75	12	31	118	249
October.....	123	2	30	155	78	20	29	127	282
November.....	92	11	15	118	92	19	24	135	253
December.....	120	6	26	152	146	12	34	192	344
1920.									
January.....	126	5	18	149	116	26	25	167	316
February.....	109	18	31	158	101	28	18	147	305
March.....	112	8	18	138	127	16	29	172	310
April.....	113	13	23	149	116	13	25	154	303
May.....	120	8	23	151	105	17	24	146	297
June.....	98	7	27	132	105	13	24	142	274
Total.....	1,308	101	287	1,696	1,220	271	319	1,810	3,506

Pacific Locks.

LOCKING OPERATIONS.

	Pedro Miguel locks.			Miraflores locks.		
	North.	South.	Total.	North.	South.	Total.
Lockages:						
Commercial lockages—						
Vessels.....	1,230	1,130	2,360	1,196	1,093	2,289
Panama Railroad vessels.....	8	9	17	7	8	15
Launches.....	1	4	5	1	3	4
Total commercial lockages.....	1,239	1,143	2,382	1,204	1,104	2,308
Noncommercial lockages—						
Canal.....	115	177	292	97	146	243
U. S. Navy and U. S. Army.....	42	143	185	42	138	180
Total noncommercial lockages...	157	320	477	139	284	423
Commercial lockages in which non-commercial vessels were included...	132	102	234	140	122	262
Summary—						
Commercial lockages.....	1,239	1,143	2,382	1,204	1,104	2,308
Noncommercial lockages.....	157	320	477	139	284	423
Total lockages.....	1,396	1,463	2,859	1,343	1,388	2,731

Pacific Locks—Continued.

LOCKING OPERATIONS—Continued.

	Pedro Miguel locks.			Miraflres locks.		
	North.	South.	Total.	North.	South.	Total.
Vessels:						
Commercial vessels.....	1,297	1,210	2,507	1,298	1,210	2,508
Commercial launches.....	10	10	20	10	10	20
Total commercial vessels.....	1,307	1,220	2,527	1,308	1,220	2,528
Noncommercial vessels (canal).....	47	46	93	42	43	85
Noncommercial barges (canal).....	71	52	123	56	42	98
Noncommercial tugs (canal).....	129	177	306	123	174	297
Noncommercial launches (canal).....	67	62	129	66	60	126
Noncommercial vessels (U. S. Navy and U. S. Army).....	68	216	284	68	215	283
Noncommercial barges (U. S. Navy and U. S. Army).....	1	8	9	2	9	11
Noncommercial tugs (U. S. Navy and U. S. Army).....	5	22	27	5	22	27
Noncommercial launches (U. S. Navy and U. S. Army).....	16	16	32	26	25	51
Total noncommercial vessels.....	404	599	1,003	388	590	978
Summary—						
Commercial vessels.....	1,307	1,220	2,527	1,308	1,220	2,528
Noncommercial vessels.....	404	599	1,003	388	590	978
Total vessels.....	1,711	1,819	3,530	1,696	1,810	3,506

Annual report of water drawn from Gatun and Miraflres Lakes for lockages and other purposes.

[In thousands of cubic feet.]

Month.	Pedro Miguel.			Miraflres.		
	Lockages.	Leakage.	Other purposes.	Lockages.	Leakage.	Other purposes.
1919.						
July.....	787,600	25,930	13,850	707,190	13,500	.....
August.....	722,020	28,980	3,810	652,910	14,000	.....
September.....	633,280	29,520	27,390	607,600	15,000	8,240
October.....	748,650	30,500	.....	704,900	15,000	14,010
November.....	704,160	35,420	39,970	629,880	15,000	57,810
December.....	1,030,990	48,800	.....	769,740	15,000	.....
1920.						
January.....	884,930	33,540	.....	740,650	15,000	13,500
February.....	620,950	23,530	92,140	667,860	15,000	8,070
March.....	705,760	16,770	119,030	726,590	15,000	.....
April.....	714,600	17,710	62,740	748,110	15,000	2,610
May.....	696,200	18,300	61,980	740,710	15,000	4,920
June.....	635,370	17,800	19,080	698,390	15,000	890
Total for year.....	8,884,510	326,800	439,990	8,394,530	177,500	110,050

ATLANTIC LOCKS.

ORGANIZATION AND PERSONNEL.

Mr. E. D. Stillwell continued as superintendent throughout the year, and Mr. H. M. Thomas as assistant superintendent. During the absence of the superintendent on 100 days' leave in the United States from May 30, 1920, his duties were assumed by the assistant superintendent.

Mr. P. R. Kiger, who was honorably discharged from the United States Army August 8, 1919, was assigned to his former position as electrical supervisor October 28, 1919. Mr. A. E. Wood, who was appointed electrical supervisor during the ab-

sence of Mr. Kiger, was demoted to assistant electrical supervisor November 4, 1919.

Mr. F. M. Easter continued as mechanical supervisor until June 24, 1920, when he was transferred to the Gatun lighthouse subdivision. This position has not been filled.

Mr. A. M. Butcher, who was honorably discharged from the United States Army October 12, 1919, and reported for duty November 20, 1919, was assigned to his former position as general operator.

The supervisory force was increased by two additional assistant supervisors, one mechanical and one electrical, effective May 5, 1920.

The general organization remained the same as throughout the previous year, there being a few changes in the personnel of the locomotive operators to take care of resignations and transfers.

A strike was called by the silver employees on February 22, 1920, and only nine silver employees reported for duty February 23, but with the cooperation and loyal support of the gold force, lockages were carried on without any delay until March 4, 1920, by which date the majority of the silver men had returned to work.

OPERATION.

Practically the same system of operation continued in effect as during the previous year.

Delays to Canal traffic due to faulty operation or failure of operating equipment have been few and of negligible magnitude. From a total of 3,047 vessels passed through Gatun locks the total delay was 4 hours and 26 minutes.

A report of lockages by months is as follows:

Month.	Northbound.			Southbound.			Grand total.
	Com- mercial.	Noncom- mercial.	Total.	Com- mercial.	Noncom- mercial.	Total.	
1919.							
July.....	86	20	106	64	46	110	216
August.....	95	5	100	86	21	107	207
September.....	97	2	99	71	6	77	176
October.....	120	4	124	72	15	87	211
November.....	89	7	96	83	13	96	192
December.....	114	7	121	138	9	147	268
1920.							
January.....	118	10	128	103	10	113	241
February.....	93	5	98	89	12	101	199
March.....	90	7	97	113	11	124	221
April.....	96	7	103	98	4	102	205
May.....	115	6	121	95	8	103	224
June.....	91	3	94	94	11	105	199
Total.....	1,204	83	1,287	1,106	166	1,272	2,559

Total amount of water used for lockage purposes, 10,293,170,000 cubic feet.

Average number of lockages per day, 6.99 plus.

Average amount of water used per lockage, 4,022,340 cubic feet plus.

Average number of commercial vessels per day, 6.923.

The emergency dams were operated each month for the purpose of instructing operators. No emergency operations were necessary.

No operation of a chain fender machine due to ship striking the chain occurred during the year.

Both lock chambers were in service during the entire year, with the exception of a few days when minor repairs and painting were being done on the gates and valves, and then at the convenience of traffic.

The battle cruiser *Renown*, with the Prince of Wales, passed through the locks, southbound, March 30, 1920. This ship has a length of 795 feet and displacement of 33,379 tons, which is greater in length and displacement than any vessel transiting the Canal to date.

MAINTENANCE.

All machines and equipment were maintained in good condition. A few changes of a minor nature were made in order to improve operating conditions and reduce the work of maintenance.

Emergency dams.—Both dams were painted, except gates and girders, with one coat of linseed oil and one coat of gray paint.

A 500-watt lamp and reflector was installed on both dams for lighting inclines. *Fenders.*—One hundred and nine fenders of native hard wood (almendra) were installed on approach walls during the year.

Locomotives and tracks.—An 8-foot section of steel conductor rail was replaced with copper rail on both side wall return tracks at foot of long inclines.

The steel rail was badly corroded from the salt water splashing into slots.

The conductor rails, covers, brackets and switches on towing and return tracks were overhauled and painted.

A new traction motor was installed in locomotive No. 656.

Towing track and return track rail joints were realigned and concreted in where necessary during the year.

Rising stem valves and machines.—The 12 intermediate valves and 24 roller trains were overhauled during the year.

Guard valve motor stator No. 269 was renewed on account of short-circuited coil.

New motor shaft couplings were installed on Nos. 254 and 255.

Renewed side seals on No. 249 and one seal on No. 248.

Filling plugs were installed on all dash pots.

A new removable lintle casting was installed in pit No. 243. Z bars were aligned and concreted in.

Miter gates and machines.—Sump pumps, motors and wiring were removed from all miter gates.

Heating lights were installed in all miter gate machines and hand rail motors.

Chain fender machines.—Shortened chain on No. 801, 4 links removed.

Steel chains on Nos. 800, 801, 802, and 803 were transferred to the intermediate machines Nos. 808, 809, 810, 811, as the chains on the former were worn considerably on the side of links that come in contact with the concrete at bottom of locks.

New banjo signal was installed on No. 810.

Brass plates were installed on cores of all main contactor relays to prevent them from holding closed by residual magnetism.

Lighting system.—The lighting conduit in lower cross-under tunnel was renewed and the conduit in center wall vertical shaft was taken out.

Conduit pipes were renewed and lead-covered wires pulled into lamp posts Nos. 9, 10, 31, 32, and 188.

Approximately 400 feet of the jute-covered telephone cable were replaced by lead-covered conductor.

Miscellaneous.—Continued making up parts and assembling disconnect switches for towing track feeders. Switches have been installed in transformer rooms, 1 in No. 749, 2 in No. 746, 2 in No. 742, 2 in No. 750, and 1 in No. 752.

Terminal boards were installed on receivers of No. 7 and No. 8 miter gates and rising stem valves Nos. 226 and 227 in the control house.

Renewed spare oil switch No. 6 in transformer room No. 752.

Made new duct line and installed 2/0-3 conductor lead-covered power cable to shop building. Old feeder No. 7526 from the west wall was pulled out for the above.

Continued retaping busses and bell terminals on machine panels.

Side wall bulkheads were painted and new hard wood (almendra) sills were installed.

Overhauled main culvert sump pump. A recess cover, seat and base with anchor bolts for base were installed in regulating valve room at north end of center wall for storage of pump.

The center wall bulkheads were dipped in crude oil and stored on platform back of the northwest side wall, lower level. A concrete vat 15 feet square by 15 inches deep and storage platform was built for this purpose.

A short circuit switch for use in starting the air compressor or motor was made and installed. This switch short circuits the series transformer and cuts out the relays while the motor is getting up to speed.

A board showing the primary power and lighting feeders to all transformer rooms was completed and installed in the control house.

Two ventilator shafts were installed in transformer rooms Nos. 756 and 753 for ventilation of rooms and operating tunnel.

Concrete sheds were constructed over the east and west wall locomotive repair pits.

The wood flooring was removed from the work shops; east, west, and center walls and concrete beams were installed.

Painting gates.—The top of all miter gates and handrails were painted during the year.

The north side, upper section of miter gates Nos. 9 and 10, were enameled with hermetic enamel.

Tunnel floors.—Tunnel floors were painted, in the middle and lower levels, east, west, and center walls.

BUILDING DIVISION.

The details of the operations of the building division during the fiscal year are covered in the report of the resident engineer, which follows:

BUILDING DIVISION.

T. C. Morris, Resident Engineer.

The following report of operations for this division for the fiscal year ended June 30, 1920, is submitted herewith.

ORGANIZATION.

On June 30, 1919, the subdivision of pier construction engaged in the construction of Pier No. 6 was abolished and all work of that division was placed under the supervision of Mr. J. B. Fields as superintendent of construction.

Mr. C. A. Nelson, formerly superintendent of construction of Pier No. 6, had been engaged on the construction of a pier for the Colombian Government and his resignation was submitted and accepted on September 25.

PERSONNEL.

Mr. H. Rowe resigned from his position as resident engineer on August 14, and the undersigned was appointed as his successor.

The building division was placed under the jurisdiction of the engineer of maintenance on that date.

Mr. S. M. Hitt continued as architect.

Mr. F. W. Blackwood, assistant engineer in charge of designs, resigned on August 21 to accept a position with the Colombian Government.

Mr. A. Hall, as supervisor, was placed in charge of construction of Fort Clayton Army post, and Mr. P. J. Corrigan, as supervisor, at Fort Davis.

BUILDING OPERATIONS.

Work was continued on Pier No. 6; Coco Solo submarine base; naval air station, Coco Solo; Army aviation base, France Field.

New projects started during the year were barracks, quarters, and wharf at Fort Sherman; Fort Davis and Fort Clayton Army posts; New silver townsite, Mount Hope; lighthouse at channel end of east breakwater; Colon-Cristobal incinerator plant; combined shop and storehouse, Cristobal mole; Panama Railroad stables, Colon; reconstruction of Royal Mail pier for use of Panama Railroad; concrete oil tanks; community house. National Catholic War Council; Royal Mail office building.

PIER NO. 6.

Construction of Pier No. 6 was completed and turned over to the receiving and forwarding agent for use on August 27, 1919.

At the beginning of the rainy season, some complaints were received on account of leakage of the roof. Expansion and contraction of the roof, due to temperature changes, were sufficient to cause slight temperature cracks in the 4-inch roof slab. This roof consists of a reinforced concrete slab 4 inches thick, 160 feet wide, and 945 feet long. Since this pier is used for the storage of freight in transit, and any damage to goods would result in claims against the Panama Railroad, it was decided to prevent, so far as possible, all possibilities of claims resulting from wetting, and the application of a five-ply tar and gravel Barrett Specification roof was authorized. Owing to the necessity of flashing each pier supporting the cargo-handling crane rail, and also owing to the large number of skylights, this tar and gravel roofing will be rather costly per square of roof covered. It is necessary to provide copper flashing for 720 of the crane rail piers and also to build copper framework to support the 210 skylights. These skylights originally consisted of 14 by 24 inch wire ribbed glass set in a $\frac{1}{2}$ by $\frac{3}{4}$ -inch rabbet with top surface of the glass flush with the surface of the concrete slab. The estimated cost of flashing and applying the tar and gravel roof is \$26,000, or \$17 per square, and work was 50 per cent completed on July 1.

On the morning of March 6, 1920, an explosion occurred on the steamship *Marne*, which was moored along the north side of the pier. This explosion resulted in the blowing in of 6 doors, 3 louvers, and 11 windows on the north side, and the vacuum caused by the explosion pulled in 6 doors on the south side of the pier. Several pieces of debris were thrown in the air, some of which fell on the roof slab. One piece, consisting of a ventilator funnel and the gearing for operating same—a total

weight of 800 pounds—fell astride one of the longitudinal reinforced concrete trusses and broke holes in the roof slab on both sides of the truss. A careful inspection showed no damage to the truss.

NAVAL SUBMARINE BASE AND NAVAL AIR STATION.

Work was continued on these projects in accordance with original plans and subsequent request of the Navy Department. The total expenditure during the fiscal year for the submarine base was \$147,317, and for the naval air station \$91,919.

ARMY AVIATION BASE, FRANCE FIELD.

All work was completed on the officers' quarters and barracks, as covered by the \$335,400 appropriation, and additional work as requested by the Army, consisting principally of the erection of one steel hangar, 110-foot span by 200 feet long, and one steel hangar 66-foot span by 140 feet long. The total expenditure at this base during the year was \$66,954.

BARRACKS, QUARTERS, AND WHARF, FORT SHERMAN.

New work authorized under the \$140,000 appropriation for barracks and quarters was completed. This work consisted of the construction of two type-20 staff quarters, two type EE-2 officers' quarters, two 150-men barracks, including exterior electrical work and municipal work. The total expenditure on this project was \$125,715.10.

The construction of the wharf authorized under the \$35,000 appropriation was completed at a cost of \$25,501.08.

FORT DAVIS AND FORT CLAYTON ARMY POSTS.

The Army building program for the fiscal year 1919-20 provided for the construction of quarters and barracks to accommodate one regiment of Infantry at Fort Clayton, Miraflores dump, and one regiment of Infantry at Fort Davis, New Gatun.

A general description of the buildings constructed was given in the last annual report and all buildings were constructed in accordance with the specifications as outlined.

On March 28, 1919, the Governor of The Panama Canal advised the chief of office as follows with reference to the construction of these two Army posts:

"Canal has organization and equipment to commence work within two weeks after location is approved and can carry out project by July 1, 1920."

This allowed a 15-month period for construction.

Funds were finally allotted to The Panama Canal on April 23 and the project was definitely approved on May 19. Work was started at Miraflores on May 20.

The total amount appropriated for Fort Davis and Fort Clayton projects was \$4,986,849, of which amount the building division was allotted \$2,851,600, the electrical division \$212,000, and the municipal division \$842,000, leaving an unexpended balance of \$81,649.

A clause in the appropriation act requiring the Governor of The Panama Canal to purchase needed materials, supplies, and equipment from various surplus stores of the War Department, so far as available, resulted in considerable delay in delivery of material. Specific instances of this are shown below. Requisitions for these materials were forwarded to the United States on June 23, 1919. It was then necessary for the general purchasing officer in Washington to communicate with the various surplus stores of the construction division of the Army in an attempt to purchase the needed material from these stores. In some instances, supplies were actually contracted for on the assumption that materials were available, but when actual shipment of material was to begin, none could be found. It was then necessary to cancel the order, advertise for purchase from commercial firms, and award bids. The tabulation below indicates some of the difficulties:

Commodity.	Requisition forwarded.	Delivery promised.	First shipment received.
Roof tile.....	June 23, 1919	Oct. 8, 1919	Dec. 6, 1919
Hardware.....	do.....	Nov. 6, 1919	Nov. 17, 1919
Plumbing fixtures.....	do.....	Oct. 5, 1919	Oct. 21, 1919
Plumbing fittings.....	do.....	Nov. 1, 1919	Dec. 18, 1919
Scully sinks.....	do.....	Nov. 3, 1919	July 10, 1920
Millwork.....	do.....	Nov. 16, 1919	Feb. 21, 1920
Lumber.....	do.....	Oct. 29, 1919	Dec. 26, 1919

Similar difficulties were also encountered on requisitions for skilled mechanics. Of 15 carpenters requisitioned for on the 1st of May, final arrival was not effected until September 5. Of 31 carpenters requisitioned for on August 12, final arrival was accomplished on December 2, and of 34 carpenters requisitioned for on May 4, final arrival was effected on June 26. The same difficulty was experienced with plasterers, plumbers, painters, bricklayers, and sheet-metal workers. Some of these delays in procuring men were due to the fact that the authorized rates of pay for skilled mechanics in the building trades at times were as much as five months in arrears of base rates in the States. For instance, the rates of pay effective on October 1, 1919, were not authorized until February 5, 1920, and the rates of pay effective February 1, 1920, were authorized on June 10, 1920.

COSTS.

Unprecedented advances have occurred during the past fiscal year in the prices of both materials and labor. The following table shows the rates paid for skilled mechanics at the time estimates for these projects were prepared, which was June 25, 1917, the rates of pay when final plans of construction were made, on June 1, 1919, and the rates of pay in effect on June 1, 1920:

Journeymen's rates.

Craft.	Estimate prepared June 25, 1917.	Plans made for construction June 1, 1919.	In effect June 1, 1920.
Bricklayers.....	\$0.88	\$1.09	\$1.34
Plasterers.....	.86	1.09	1.35
Plumbers.....	.84	1.04	1.30
Carpenters.....	.74	.95	1.22
Roofers.....	.74	1.03	1.03
Painters.....	.71	.91	1.19
Metal lathers.....		.95	1.07

The actual increase in cost due to these increases in gold journeymen's rates over the rates in effect on July 1, 1919, are shown for the various crafts in the accompanying tables (Table No. 1 for Fort Clayton and Table No. 2 for Fort Davis), and the increases due to advances in rates for silver employees are shown on Table No. 3. The total amounts are as follows:

Fort Clayton:		Fort Davis:	
Gold.....	\$49,632.22	Gold.....	\$57,519.20
Silver.....	25,079.89	Silver.....	25,755.40
Total.....	74,712.11	Total.....	83,274.60

The increased costs of two of the principal commodities, lumber and roof tile, are shown in the table below. These increases are based on storehouse prices of July 1, 1919.

Commodity.	Fort Clayton.		Fort Davis.	
	Amount.	Per cent increase.	Amount.	Per cent increase.
Lumber.....	\$27,431	18.3	\$38,985	25.9
Roof tile.....	26,665	45.6	26,665	45.6

Total value of material used on these projects during the year was \$630,467 at Fort Clayton and \$632,831 at Fort Davis. Other commodities increased in price at various rates.

Owing to delay in starting the projects, in delivery of materials, and in the arrival of skilled mechanics, the Army posts were not completed by July 1, 1920. At Fort Clayton all buildings were completed except headquarters, which is 85 per cent complete, one battalion barracks, 85 per cent, and one battalion barracks, 70 per cent; while at Fort Davis all buildings were completed except as follows: One 2-family captain's set, 84 per cent complete; one 2-family captain's set, 50 per cent

complete; one 4-family lieutenant's, 90 per cent; one 4-family lieutenant's, 80 per cent; headquarters building, 95 per cent; one battalion barracks, 70 per cent; and one battalion barracks, 60 per cent.

By August 1, 1920, these projects will be completed, except at Fort Clayton, one battalion barracks, 90 per cent, and at Fort Davis, one battalion barracks, 90 per cent.

Table No. 4, attached, shows the estimated and actual time in man-days for the various crafts for each building. Similar charts were prepared semimonthly, from which the force required to complete the work was computed.

The total expenditures for building division work to July 1, 1920, was as follows:

	Labor.	Material.	Other charges.	Total.
Fort Clayton.....	\$508, 019	\$630, 467	\$177, 932	\$1, 316, 418
Fort Davis.....	520, 783	632, 831	161, 582	1, 315, 196

This leaves a balance of \$109,382 at Fort Clayton and \$110,604 at Fort Davis. Present estimates indicate that these posts will be completed within the appropriation.

NEW SILVER TOWNSITE, MOUNT HOPE.

On July 18, 1919, authority was given for the construction of 49 buildings at Mount Hope at an estimated cost of \$441,000. Thirty-nine of these buildings were to be of standard Panama Canal 12-family frame quarters for silver employees, and 10 standard Panama Canal 32-room frame quarters for silver bachelor employees. Work was not started on this project until January 1, 1920, and then only with a limited force, owing to inability of securing building materials. The project as a whole was 54 per cent complete on this date, the total expenditure to July 1 being \$236,628.26.

In connection with this project, there was also authorized the construction of a silver commissary, of sufficient capacity to provide for future development of the townsite. This commissary is typical of the silver commissaries on the Canal Zone except that boots and shoes, hardware, and dry goods will be sold on the second floor. A 3-ton capacity freight elevator will be installed for handling goods to the second floor and a modern electric-driven refrigerating apparatus will be installed for refrigerating the cold-storage section. The estimated cost of this commissary is \$43,000. Work on July 1 was 75 per cent completed; cost was \$32,291.20.

LIGHTHOUSE AT CHANNEL END OF EAST BREAKWATER.

On September 9, 1919, authority was given the building division for the construction of a foundation for a 100-foot lighthouse at the channel end of east breakwater and for the purchase and erection of a lighthouse tower.

Proprietary purchase was authorized for a 100-foot steel tower similar to the one constructed at Punta Mala, and on October 8, 1919, contract was awarded for this tower at the price of \$6,500, delivered in Colon. Contractors' drawings were received on February 3, giving the dimensions of the base of the tower and sufficient data for computing loads on tower base.

The foundation consists of a 23-foot 7-inch square reinforced-concrete deck designed for a live load of 150 pounds per square foot and supported on four sides by a reinforced-concrete beam 7 feet deep and 2 feet thick. Twelve steel-type piles, three at each corner, with cast-iron shoes, were driven to rock at elevation minus 115 feet. These piles were driven with a floating driver equipped with an 1,800-pound falling part steam hammer. The depth of the water at this lighthouse was 20 feet and upon filling the pipe piles with concrete, reinforcing cages consisting of 10 $\frac{7}{8}$ -inch round reinforcing bars were lowered to elevation minus 30, thus providing the reinforced-concrete pile support whenever the steel pipe has rusted away. The construction of this foundation was completed on June 22, and latest advice received from the States was on July 26, stating that steel tower had been completed and passed inspection and material was en route to the Isthmus.

COLON-CRISTOBAL INCINERATOR PLANT.

Work was commenced on the construction of a 60-ton daily capacity garbage incinerator located about 2,000 feet east of the east diversion on the Mount Hope-Fort Randolph road. This site was selected to allow for future development of the new silver townsite at Mount Hope. The building housing this plant is 37 feet 3 inches by 101 feet 3 inches, two stories high, reinforced-concrete construction with tile roof. The first floor contains two 30-ton units consisting of water-jacketed steel furnaces, together with preheaters induced and forced-draft fans, feed water pumps, and fuel

oil pumps. The second floor is of reinforced concrete designed to support a live load of 200 pounds per square foot, and will be used for the storage of garbage and its selection for proper incineration.

Garbage will be delivered to the plant in motor trucks with removable steel bodies. These bodies of 2½ yards capacity will be lifted from the trucks by an overhead traveling electrically operated crane and the contents will be either dumped directly into the incinerator hopper or stored until such time as furnace conditions warrant charging.

The plant is provided with a platform scale for weighing all garbage delivered to the plant.

Steam generated in the incinerator will be used for drying fertilizer and bone meal which will be manufactured in an adjoining building. On July 1, 1920, this building was practically completed, all the equipment was installed, and the work remaining to be done consisted of placing the fire-brick lining in the combustion chambers and breeching. The estimated cost of this project was \$113,000; the cost to July 1, 1920, \$110,073.52.

COMBINED SHOP AND STOREHOUSE, CRISTOBAL MOLE.

A combined shop and storehouse is under construction on the Cristobal Mole to provide a 76 by 113 foot shop for the mechanical division for small marine work and also a storeroom for the supply department, 76 by 126 feet, for ships' stores. The supply department end of this building will be two stories high, and the second floor, having an area of 141 by 76 feet, will be available for rental to steamship companies for ships' supplies. Toilets are provided for gold and silver employees. A 3-ton freight elevator will handle material to the second floor. The estimated cost of this building is \$90,000, and on July 1, 1920, it was 52 per cent completed, the total expenditure to that date being \$46,182.33.

PANAMA RAILROAD STABLES.

It became necessary, owing to filling of certain lots in Colon, and for the municipal improvements of the same, to demolish all privately owned and Panama Railroad stables in Colon and reconstruct same between Sixteenth and G Streets and Folks River. Authority was accordingly issued for the construction of stables to accommodate 432 horses and the necessary feed rooms, shops, storehouses, wagon sheds, and living quarters for attendants. The total estimated cost of this project is \$142,000, and the total cost at the end of the fiscal year was \$118,990. The project as a whole was 84 per cent completed.

REMODELING OF THE OLD ROYAL MAIL PIER FOR THE PANAMA RAILROAD FOR NATIVE PRODUCE.

Circular 512, dated November 11, 1913, requiring the demolition of all nonratproof piers by January 1, 1919, resulted in the demolition of the superstructure of the old Royal Mail pier. The foundation of this pier remained intact and was purchased by the Panama Railroad Company, who then authorized the construction of a fireproof and ratproof superstructure for the accommodation of small coastwise and native craft. Authority was issued on the building division for the designing and construction of same. A reinforced concrete slab was designed for 175-pound live load over the entire structure and was built accordingly, and the area was roofed with material salvaged from the old Panama Railroad Pier No. 2. Same was covered with corrugated iron. Sliding doors were installed on both sides of 30-foot centers for the handling of native produce. Water lines were installed for fire protection and for supplying water to ships. The area covered by this shed is 60 feet by 400 feet. The total cost of the project was \$38,247.70.

CONCRETE OIL TANKS.

Instructions were issued by the supply department for the construction of two reinforced concrete oil tanks of 55,000 barrels capacity each. These tanks are 115 feet inside diameter at the base and 116 feet inside diameter at the top. The tanks are 30 feet deep. The walls are 1 foot thick at the base and 6 inches thick at the top and are reinforced spirally with 1½-inch diameter rods. These rods were rolled by the mechanical division and a considerable saving was effected in the amount of steel used by obtaining these rods in greater lengths than are practical to secure commercially from the States. Our experience has been that 33-foot length reinforcing bars are as long as can be shipped conveniently from the States, and the bars as furnished by the mechanical division were from 40 feet to 70 feet long. The lap splice was used, necessitating a lap of 5 feet, and the obtaining of this steel in longer lengths resulted in a saving of approximately 5,000 feet on the two tanks.

After the pouring of the reinforced concrete floor slab of this tank the walls were poured with inner and outer forms built in 12-foot sections 6 feet in height, and pours

were made on alternating days, the intermediate day being required for the raising of the form and the placing of the reinforcing steel. The inner surface was given a rub-float finish.

Two mixers were used for the pouring of these walls and the pouring was so arranged that no new material was dumped on material which had been in place for more than 10 minutes.

Estimates indicated that a reinforced concrete roof would cost approximately one-half as much as a structural steel roof. A reinforced concrete roof was therefore built. This roof is supported by one central column and 12 columns equally spaced on a 29-foot radius. From the central column 12 beams radiate to this intermediate ring of 12 columns, which are tied together at the top by 12 beams, forming a duodecagon. From this frame 24 beams were poured, supported by the wall of the tank. A 4-inch reinforced concrete slab covers the entire area. The estimated cost of these tanks is \$55,000, and the cost to July 1 was \$42,751.39 for the tank at Mount Hope and \$42,260.83 for the tank at La Boca. The increase in cost of the tank at La Boca is due to the fact that it was necessary to excavate 6,000 cubic yards of rock to prepare the foundation and to construct a dike and a fire wall. The status on July 1 was: Mount Hope tank, 98 per cent completed; La Boca tank, 60 per cent completed.

MISCELLANEOUS WORK.

Other work done for The Panama Canal during the past fiscal year was as follows:

Moving two type-15 houses from Las Cascadas to Balboa and the reerection of same as a type-17 cottage for the Seamen's Home.

Removal of one type-14 residence from Las Cascadas and the reerection of same as a dormitory for the Seamen's Home.

Removal and reerection of seven type-15 cottages and one type-7 two-family house from Las Cascadas to Pedro Miguel, at a cost of \$21,063 for nine apartments.

Removal and reerection of three type-18 bachelor quarters from Las Cascadas to Balboa at a cost of \$32,208.27.

Removal of four modified type-7 quarters from Las Cascadas and their reerection as one-family houses for pilots' quarters—two at Gatun and two at Pedro Miguel.

Removal and reerection of three type-7 quarters from Las Cascadas to New Cristobal, at a cost of \$19,397.06 for six apartments.

The construction of three play sheds for the bureau of clubs and playgrounds, one at Pedro Miguel, one at Gatun, and one at New Cristobal, at a cost of \$10,585.56.

The conversion of section F, old Ancon Hospital, into 14 family quarters; conversion of sections 17, 18, 19, and the kitchen of the old Ancon Hospital into 8 family quarters; conversion of the old Chinese detention camp into 8 family quarters, at a total cost of \$66,441.28 for 30 apartments; removal from the vicinity of section F, Ancon Hospital, of the colored maids' quarters to a site nearer the hospital activities.

The construction of a 60 by 300 foot warehouse for oil drums and waste for the supply department, at a cost of \$22,607.81.

The demolition of the old Mount Hope storehouse and the reerection of same as a storehouse for the printing plant at Mount Hope, storehouse for the supply department at Mount Hope, and as a reclaiming shop and store for the supply department at Balboa.

The demolition of the wooden section of the old French steel pier at Balboa.

The painting of the exterior of all frame quarters in Balboa, La Boca, Pedro Miguel, Gatun, and New Cristobal and 30 per cent of the frame buildings in Ancon.

Painting of the interior of 100 type-17 cottages, 96 type-14 cottages in Ancon and Balboa, the interior of all concrete residences in Balboa, the interior of the administration building, and the interior of all quarters in La Boca.

WORK FOR INDIVIDUALS AND COMPANIES.

Work was started on the community house for the National Catholic War Council at Balboa. The estimated cost of this building is \$85,000 and the expenditure to July 1, 1920, was \$28,174.34.

Work was started on the construction of the office building and quarters for the Royal Mail Steam Packet Company. The estimated cost of this building is \$275,000 and the expenditure up to July 1, 1920, was \$57,795.73.

Work was completed on the office and bachelor quarters in Balboa for the Central and South America Cable Company.

FORCE.

On July 1, 1919, the force was 205 gold men and 1,530 silver men, a total of 1,735. This was increased to the maximum of 2,268 men on November 1, 1919, of which 328 were on the gold roll and 1,940 on the silver roll. At the end of the fiscal year, June 30, 1920, the force totaled 1,887 men, of which 512 were on the gold roll and 1,375 on the silver roll.

TABLE No. 1.—Increase in cost of gold labor due to increase in pay over rates in effect when project was approved.

FORT CLAYTON ARMY POST.

	1919				1919-1920				1920				Total, July 1, 1919, to Aug. 1, 1920.	
	July 1 to Aug. 1.		Aug 1 to Oct. 1.		Oct. 1 to Feb. 1.		Feb. 1 to Apr. 1.		Apr. 1 to June 1.		June 1 to Aug. 1.			
	In-crease.		Increase.		Increase.		Increase.		Increase.		Increase.			
													Man days.	
	Man days.	Day.	Period.	Day.	Period.	Day.	Period.	Day.	Period.	Day.	Period.	Day.	Man days.	Period.
Artisans:														
Bricklayers.....	250	80.16	\$40.00	1,010	\$0.80	\$908.00	350	\$1.60	\$560.00	320	\$1.68	\$537.60	35	\$2.00
Plasterers.....	200	16	32.00	1,775	80.1	420.00	1,375	1.36	1,870.00	190	1.52	2,888.00	2,088	4,846.40
Plumbers.....	140	32	134.40	1,340	1.04	1,393.60	740	1.52	1,124.80	820	1.76	1,443.20	678	2.08
Painters.....	420	24	96.00	320	32	102.40	640	64	384.00	680	.80	544.00	1,288	2.24
Carpenters.....	400	24	144.00	3,200	80.2	560.00	2,200	1.28	2,816.00	2,050	1.36	2,788.00	2,270	2.08
Metal lathers.....	600	24	144.00	66	.96	63.36	77	.96	73.92	90	1.96	86.40	52	1.96
Foremen:														
Bricklayers.....	50	50	.....	100	64	64.00	50	1.44	72.00	25	1.52	38.00	.....	1.84
Plasterers.....	50	50	.....	100	64	64.00	75	1.20	90.00	75	1.36	102.00	75	1.92
Plumbers.....	50	72	36.00	100	1.44	144.00	50	1.92	96.00	50	2.16	108.00	50	2.48
Painters.....	1	1.04	.....	75	1.12	84.00	50	1.44	72.00	50	1.60	80.00	50	3.04
Carpenters.....	600	24	144.00	1,100	.80	880.00	200	1.28	256.00	200	1.36	272.00	200	2.08
Total.....	.....	.....	530.40	.....	7,583.36	.....	7,414.72	.....	8,887.20	.....	14,819.28	.....	39	234.96
15 per cent gratuity.....	.....	.....	79.56	.....	1,137.50	.....	1,112.21	.....	1,333.08	.....	2,222.89	.....	5,885.24	.....
Cost to building division.....	.....	.....	609.96	.....	8,720.86	.....	8,526.93	.....	10,220.28	.....	17,042.17	.....	45	120.20
10 per cent, P. C.....	.....	.....	60.99	.....	872.09	.....	852.69	.....	1,020.00	.....	1,704.22	.....	4,512.02	.....
Cost to U. S. Army.....	.....	.....	670.95	.....	9,592.95	.....	9,379.62	.....	11,242.31	.....	18,746.39	.....	49	632.22

1 Subject to change effective Apr. 1.

TABLE No. 3.—*Additional cost due to increase in wages to silver employees.*

FORT CLAYTON.

	June 1, 1919, to July 1, 1919.			July 1, 1919, to Feb. 1, 1920.			Feb. 1, 1920, to July 1, 1920.			July 1, 1920, to Aug. 1, 1920.			Total, June 1, 1919, to Aug. 1, 1920.	
	Man days.	Man days.	Man days.	Increase per day.	Additional cost.	Man days.	Increase per day.	Additional cost.	Man days.	Increase per day.	Additional cost.	Man days.	Additional cost.	Man days.
All classes.....	25,000	75,500		\$0.12	\$9,066.00								\$19,826.00	
Plus 15 per cent gratuity.....					1,359.90								2,973.90	
Cost to building division.....					10,425.90								22,799.90	
Plus 10 per cent P. C.....					1,012.59								2,279.99	
Cost to U. S. Army.....					11,408.49								25,079.89	

FORT DAVIS.

	June 1, 1919, to July 1, 1919.			July 1, 1919, to Feb. 1, 1920.			Feb. 1, 1920, to July 1, 1920.			July 1, 1920, to Aug. 1, 1920.			Total, June 1, 1919, to Aug. 1, 1920.	
	Man days.	Man days.	Man days.	Increase per day.	Additional cost.	Man days.	Increase per day.	Additional cost.	Man days.	Increase per day.	Additional cost.	Man days.	Additional cost.	Man days.
All classes.....		76,500		\$0.12	\$9,180.00								\$20,360.00	
Plus 15 per cent gratuity.....					1,377.00								3,051.00	
Cost to building division.....					10,557.00								23,414.00	
Plus 10 per cent P. C.....					1,053.70								2,311.40	
Cost to U. S. Army.....					11,612.70								25,755.40	

On July 11, 1919, all silver employees receiving 20 cents per hour or less received a 2 cent increase.

On July 11, 1919, all silver employees receiving more than 20 cents per hour received a 1 cent increase.

On Feb. 1, 1920, all silver employees received an increase of 2 cents per hour.

On July 1, 1920, all silver employees received an increase of 2 cents per hour.

TABLE NO. 4.—*Estimated and actual time in man days for various crafts.*

Building name.	Bricklayers.			Plasterers.			Rubbers.		
	Esti- mate.	Actual.		Esti- mate.	Actual.		Esti- mate.	Actual.	
		Davis.	Clay- ton.		Davis.	Clay- ton.		Davis.	Clay- ton.
Headquarters.....	75	¹ 112½	63	187	368	305	170	225½	279½
Special barracks.....	66	61½	53½	205	396½	230½	220	238½	85
Battalion barracks.....	175	213½	170½	595	888½	750	410	559	² 248½
Do.....	175	191½	166½	595	788	746	410	559½	619
Do.....	³ 175	275½	185½	595	1,142	740	410	459½	622
Field officers' and captains' quarters.....	51	51½	42	167	159½	111½	16	24½	18½
Do.....	51	51½	42	167	159½	111	16	24½	18
Do.....	51	49½	43	167	154½	127	16	24	17½
Do.....	51	49½	43½	167	154½	130	16	24	17
Do.....	51	54	54½	167	122½	116	16	33½	17½
Do.....	51	47½	47½	167	135	131	16	24½	10
Do.....	51	47½	47½	167	135	130	16	24½	10
Do.....	51	58	51	167	123½	126	16	28½	11½
Do.....	51	58	51	167	123½	116½	16	28½	11
Do.....	51	51½	48	167	117½	117	16	18½	14½
Do.....	51	51	48½	167	117½	117	16	20½	14
Do.....	51	51	49	167	117½	117	16	20½	14
Lieutenant 4-family quarters.	68	68½	67½	192	174½	161	33	38½	17½
Do.....	68	68½	68	192	174½	176	33	38½	17
Do.....	68	68½	66	192	188½	158	32	27½	28½
Do.....	68	68	66	192	188½	153½	32	27	28
Do.....	68	71½	59½	192	191	176½	33	34	30
Do.....	68	71½	60	192	191	175	33	34	30
Lieutenant 6-set quarters.	65	67½	62½	183	165½	209½	23	29½	28½
Noncommissioned officers' quarters.....	30	26½	30	59	89	65½	.....	12½	7½
Do.....	30	26½	30	59	89½	66	.....	12½	6
Do.....	30	29½	30	59	114	66	.....	11	6½
Do.....	30	29½	30	59	114	66	.....	11	5½
Do.....	30	43½	29½	59	85½	61½	.....	33	.....
Do.....	30	44	29½	59	85½	60	.....	33	.....
Servants' quarters.....	18	22½	30	48	54	48	20	18	8
Total.....	1,949	2,181½	1,865½	5,918	7,108½	5,863½	2,051	2,697½	2,240½

¹ 6,000 more blocks than Fort Clayton headquarters.² Part of the rubbing done by silver labor.³ 10,000 more blocks than Fort Clayton battalion barracks.

TABLE NO. 4.—Estimated and actual time in man days for various crafts—Continued.

Building name.	Carpenters.			Plumbers.			Roofers.			Painters.		
	Estimate.	Actual.		Estimate.	Actual.		Estimate.	Actual.		Estimate.	Actual.	
		Davis.	Clayton.		Davis.	Clayton.		Davis.	Clayton.		Davis.	Clayton.
Headquarters.....	600	849 $\frac{3}{4}$	756 $\frac{1}{2}$	213	226 $\frac{3}{4}$	235 $\frac{1}{4}$	48	76 $\frac{3}{4}$	75	174	249 $\frac{1}{2}$	195
Special barracks....	580	530 $\frac{1}{4}$	643	246	263 $\frac{1}{2}$	231	53	50 $\frac{1}{2}$	59 $\frac{3}{4}$	206	146 $\frac{1}{2}$	174
Battalion barracks..	900	1,249 $\frac{1}{4}$	1,346	770	1,685 $\frac{1}{4}$	733 $\frac{3}{4}$	80	94 $\frac{1}{2}$	88 $\frac{1}{2}$	375	1,375	314 $\frac{3}{4}$
Do.....	900	1,250	1,994	770	1,685	1,760 $\frac{1}{2}$	80	128 $\frac{1}{2}$	77 $\frac{1}{4}$	375	1,375	1,377
Do.....	900	1,371 $\frac{1}{4}$	1,092	770	636	1,686 $\frac{1}{2}$	80	128 $\frac{1}{2}$	111	375	375	1,385 $\frac{1}{2}$
Field officers' and captains' quarters.....	140	203 $\frac{1}{4}$	168	54	62	46 $\frac{1}{4}$	9	20	9	40	38	57
Do.....	140	203 $\frac{1}{4}$	169	54	62	46	9	20	8 $\frac{1}{2}$	40	38	57
Do.....	140	200 $\frac{1}{2}$	133	54	56	53 $\frac{1}{4}$	9	18 $\frac{1}{2}$	10	40	39 $\frac{1}{2}$	57
Do.....	140	200 $\frac{1}{2}$	129	54	57	52	9	18 $\frac{1}{2}$	10	40	39 $\frac{1}{2}$	58 $\frac{1}{2}$
Do.....	140	191 $\frac{1}{4}$	150	54	65 $\frac{1}{2}$	44 $\frac{1}{2}$	9	14 $\frac{1}{2}$	11 $\frac{1}{2}$	40	36 $\frac{1}{2}$	53 $\frac{1}{2}$
Do.....	140	196 $\frac{1}{2}$	187	54	53	45 $\frac{1}{2}$	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	40	54 $\frac{1}{2}$	45 $\frac{1}{2}$
Do.....	140	196 $\frac{1}{2}$	187	54	54	46	9	10 $\frac{1}{2}$	11	40	54 $\frac{1}{2}$	45
Do.....	140	170	187	54	56	52	9	9 $\frac{1}{2}$	11	40	51 $\frac{1}{2}$	41
Do.....	140	170 $\frac{1}{4}$	188	54	56	53	9	9 $\frac{1}{2}$	10	40	51 $\frac{1}{2}$	40
Do.....	140	172 $\frac{1}{4}$	147	54	58 $\frac{1}{4}$	46	9	13 $\frac{1}{2}$	8	40	51	45
Do.....	140	172 $\frac{1}{4}$	158	54	58 $\frac{1}{4}$	46	9	13	8	40	51	45
Do.....	140	172 $\frac{1}{4}$	167	54	58 $\frac{1}{4}$	47 $\frac{3}{4}$	9	13	10	40	51	46
Lieutenant 4-family quarters.....	150	212	207	57	63	51 $\frac{1}{2}$	14	10	12	45	42 $\frac{1}{2}$	60 $\frac{1}{2}$
Do.....	150	212	198	57	63	52	14	10	11	45	42 $\frac{1}{2}$	65
Do.....	150	241	234	57	76 $\frac{1}{4}$	64	14	16	10	45	45	47 $\frac{1}{2}$
Do.....	150	241	234	57	76	56 $\frac{1}{2}$	14	16	10	45	45	46
Do.....	150	246 $\frac{3}{4}$	204 $\frac{1}{2}$	57	58 $\frac{1}{2}$	55	14	9 $\frac{1}{2}$	11 $\frac{1}{2}$	45	52 $\frac{1}{2}$	57 $\frac{1}{2}$
Do.....	150	246 $\frac{3}{4}$	206 $\frac{1}{2}$	57	58 $\frac{1}{2}$	55	14	9 $\frac{1}{2}$	10	45	52 $\frac{1}{2}$	57
Lieutenant 6-set quarters.....	140	216	209 $\frac{1}{2}$	65	64	36	17	9 $\frac{1}{2}$	18 $\frac{1}{2}$	38	68 $\frac{3}{4}$	42 $\frac{1}{2}$
Noncommissioned officers' quarters.....	138	163 $\frac{3}{4}$	169	46	50	35	9	7 $\frac{1}{2}$	9 $\frac{1}{2}$	81	32 $\frac{3}{4}$	57
Do.....	138	163 $\frac{3}{4}$	169	46	50	41 $\frac{1}{2}$	9	7 $\frac{1}{2}$	9	81	32 $\frac{3}{4}$	60
Do.....	138	187 $\frac{1}{2}$	163	46	51	41	9	10 $\frac{1}{2}$	7	81	47 $\frac{1}{2}$	72 $\frac{1}{2}$
Do.....	138	187	163	46	51	37 $\frac{1}{2}$	9	10 $\frac{1}{2}$	7	81	47 $\frac{1}{2}$	72
Do.....	138	193 $\frac{1}{4}$	204	46	40 $\frac{1}{2}$	38	9	14	8 $\frac{1}{2}$	81	41 $\frac{1}{2}$	63
Do.....	138	193 $\frac{1}{4}$	204	46	40 $\frac{1}{2}$	68	9	13 $\frac{1}{2}$	8	81	41 $\frac{1}{2}$	63
Servants' quarters..	96	54 $\frac{1}{2}$	101	38	49 $\frac{1}{2}$	56 $\frac{1}{2}$	18	9 $\frac{1}{2}$	18	.....	36	36
Total.....	7,524	10,258 $\frac{1}{4}$	9,234	4,138	3,948 $\frac{1}{4}$	3,912 $\frac{1}{2}$	622	803 $\frac{3}{4}$	679	2,779	3,704	2,835 $\frac{1}{2}$

¹ Estimated part of this work.

TABLE No. 5.—Comparative unit cost of buildings.

Item.	Number of buildings.	Name of building.	Class.	Division of project.	Handling material.	Plumbing.	Electrical work.	Municipal work.	Mileage.	Cost of building proper.	Cubical contents (feet).	Cost per cubic foot.
			1	2	3	4	5	6	7	8	9	10
		FORT CLAYTON INFANTRY REGIMENT.										
1	12	2 set captain's and field officers' quarters.	C, 2 story.	\$17,914.52	\$668.03	\$1,402.21	\$904.94			\$14,939.34	\$72,000	\$0.2075
2	6	4 set lieutenant officers' quarters.	do.	23,851.61	770.70	1,581.44	1,148.08			20,351.83	92,300	.2205
3	1	6 set lieutenant bachelor quarters.	do.	27,685.83	741.11	2,078.25	1,338.84			23,306.63	86,700	.2711
4	6	4 set noncommissioned officers' quarters.	do.	16,387.13	331.55	1,274.01	831.92			13,919.67	64,000	.2175
5	3	Battalion barracks.	C, 3 story.	181,878.02	6,117.65	20,708.91	4,068.08			150,983.38	1,048,000	.1441
6	1	Special barracks.	C, 2 story.	90,324.70	2,894.02	7,664.35	3,070.05			77,236.28	522,000	.1481
7	1	Headquarters.	do.	99,414.22	2,990.73	5,933.95	5,101.63			85,095.29	556,000	.1531
8	2	Stables, 42 stalls.	D, 1 story.	7,107.31	33.85	224.19	317.76	\$2,420.96	\$301.92	4,013.73	97,000	.0417
9	1	Stable, 34 stalls.	do.	6,139.85	74.07	242.18	234.69	2,032.89		3,556.02	85,000	.0401
10	1	Stable, 35 stalls.	do.	5,083.30	93.21	238.78	208.74	1,401.04		3,140.90	60,000	.0518
11	1	Wagon shed, 29 stalls.	do.	2,631.34	16.16	5.12	74.05	1,228.11		1,358.10	60,300	.0225
		FORT DAVIS INFANTRY REGIMENT.										
12	12	2 set field officers' and captain's quarters.	C, 2 story.	19,794.26	595.64	1,567.84	753.95			16,876.83	72,000	.2344
13	6	4 set lieutenant's quarters.	do.	25,479.58	677.08	1,715.95	985.11			22,101.44	92,300	.2395
14	1	6 set lieutenant bachelor quarters.	do.	25,887.30	943.24	1,741.88	812.82		32.07	22,357.29	86,700	.2579
15	6	4 set noncommissioned officers' quarters.	do.	17,708.46	504.61	1,320.99	1,004.88			14,877.98	64,000	.2325
16	3	Battalion barracks.	C, 3 story.	182,391.55	4,501.62	20,762.71	4,132.67			152,974.55	1,048,000	.1460
17	1	Special barracks.	C, 2 story.	93,679.64	2,516.81	7,232.67	2,604.28			81,335.88	522,000	.1568
18	1	Headquarters.	do.	101,382.73	2,751.19	5,732.93	5,237.91			86,460.80	556,000	.1535
19	2	Stables, 42 stalls.	D, 1 story.	5,036.46	26.68	203.33	13.67	2,064.32	1,209.92	2,728.46	97,000	.0281
20	1	Stable, 34 stalls.	do.	3,406.49	62.94	207.18	28.87	1,749.33		3,456.37	85,000	.0379
21	1	Stable, 35 stalls.	do.	3,413.13	76.78	243.48	3.92	1,333.32		1,757.53	60,000	.0290
22	1	Wagon shed, 29 stalls.	do.	1,643.31	69.93		1.20	1,210.99		361.19	60,300	.0060

PANAMA RAILROAD COMPANY.									
45	1	Carpenter shop, Mount Hope...	D, 1 story.	9,499.95	470.69	.....	415.09	.....	68,400
46	1	Garage, Mount Hope.....	do.	8,851.44	202.32	.....	810.40	.....	58,300
47	6	Stables.....	do.	3,491.32	278.86	.....	364.35	.....	35,700
48	5	Wagon sheds.....	E, 1 story.	1,183.31	59.10	.....	40.52	.....	34,000
49	1	Office and feed room.....	do.	3,484.86	179.59	.....	9.79	.....	19,000
50	1	Shop building.....	do.	1,594.49	119.42	.....	343.01	.....	13,336
		INDIVIDUALS AND COMPANIES.					220.81	.....	23,900
51	1	Office building for Central & South American Telegraph Company.	C, 2 story..	56,639.70	2,484.67	1,592.03	2,922.89	.....	160,000
								.....	3102

¹ No itemized costs kept.

Column No. 7, "Miscellaneous," includes design and all items of other charges not included under columns Nos. 3, 4, 5, and 6.
Column No. 8, "Cost of building proper," includes labor and material other than that included under columns Nos. 3, 4, 5, 6, and 7.

DESCRIPTION OF VARIOUS CLASSES OF BUILDINGS.

Class A: Wood piers on concrete footings; asphalt shingle roof.

Class B: First floor paved over earth fill; reinforced concrete columns and I beams; block walls; asphalt shingle roof on wood rafters.

Class C: Reinforced concrete footings, piers, beams, columns, and veranda floors; concrete block walls and partitions; wood interior floors; red mission tile roof on wood sheathing and rafters.

Class D: Concrete floor and rat wall; walls and roof supports wood.

Class E: Concrete floor and rat wall; concrete block walls, wood roof supports; corrugated galvanized iron roofing.

Class F: Reinforced concrete footings, piers, beams, columns, and veranda floors; concrete block walls and partitions; wood interior floors; green asphalt shingle roof on wood sheathing and rafters.

DREDGING DIVISION.

The details of the operations of the dredging division during the fiscal year are covered in the report of the superintendent of dredging, which follows:

DREDGING DIVISION.

J. M. Pratt, Superintendent.

The following report of operations in the dredging division during the fiscal year ended June 30, 1920, is submitted herewith:

DIVISION ORGANIZATION.

All dredging operations embracing Atlantic entrance, Gatun Lake, Gaillard Cut, Miraflores Lake, and Pacific entrance sections of the Canal, with auxiliary dredging at the Atlantic and Pacific terminals and Chagres River gravel operations, have been handled direct from the division headquarters at Paraiso for the entire year. Field offices were maintained at Balboa and Cristobal.

DREDGING PLANT.

The following dredges and other floating plant were in operation during the year:

The 15-yard dipper dredge *Paraiso* was operated for nine months of the year on general maintenance work at East and West Culebra, Gatun Lake, excavating and deepening channel at Paraiso and Miraflores P. I. improvement works, excavating material at Cucaracha slide, widening the approach channels to Cristobal Harbor and west slip coaling station, and deepening anchorage slips north and south of Pier No. 6, Cristobal Harbor.

The 15-yard dipper dredge *Gamboa* was operated for seven months of the year excavating and deepening the channel at Paraiso P. I. improvement works, excavating slide material at East Culebra and Cucaracha slides, and widening the approach channel to the west slip of Cristobal coaling station.

The 15-yard dipper dredge *Cascadas* was engaged nearly 10 months of the year on general maintenance and original excavation in Balboa Inner Harbor, and deepening the slip between Docks Nos. 7 and 8 and in front of Dock No. 6, Balboa, removing shoals at West Culebra and material from Cucaracha slide.

The French ladder dredge *Marmot* returned to active service December 8, 1919, and for the remainder of the fiscal year was engaged in the sand and gravel service in the Chagres River, also removing shoal at the Gamboa dock and uncovering the gravel beds. All concrete on the Isthmus is manufactured from sand and gravel obtained in this manner.

The 20-inch pipe-line dredge *No. 83* returned to service November 28, 1919, and was engaged five and one-half months on general maintenance work in the Canal channel at the Pacific entrance and at Miraflores P. I. improvement work. This dredge was then retired from dredging operations May 14, 1920. This dredge was used from June 21 to 27 to remove coal from a sunken barge and again laid up.

The 20-inch pipe-line dredge *No. 84* was operated for 10 months of the year on general maintenance work in the Pacific entrance, Balboa Inner Harbor, including excavating in front of Docks Nos. 6 and 7, Balboa Harbor, and removing material in front of Cucaracha slide.

The 20-inch pipe-line dredge *No. 86* was engaged nine months during the year on general maintenance work at the Pacific entrance, Balboa Inner Harbor, and excavating at Miraflores improvement work, and deepening channel in Gaillard Cut south of and at Cucaracha slide.

The drillboat *Teredo No. 2* was engaged for seven and one-half months of the year in mining operations at Paraiso and Miraflores P. I. Channel improvement works, also in the Pacific entrance channel and in Gaillard Cut at Cucaracha slide.

The hydraulic grader *No. 1* was engaged for 11 months of the year ditching and grading West Culebra, including Barge Repair and Lirio slides, and sluicing at Cucaracha slide.

The hydraulic grader *No. 3*, retired from service last year, was returned to work November 1, 1919, and was engaged in sluicing and grading at Cucaracha slide for the remainder of the fiscal year.

The floating air compressor *No. 27* was tied up at Gamboa out of commission from July, 1919, to January 31, 1920, and was used in raising the sunken steamship *Marne*

at Cristobal from the latter date to May 7, 1920, and again retired from service May 8, 1920.

The 300-ton cranes *Hercules* and *Ajax*, with the crane boat *La Valley* and wrecking barge No. 91, were operated by the dredging division the entire year.

The seagoing ladder dredge *Corozal* was tied up at Gamboa from July to September, 1919, and was under repairs at Balboa during September and part of October, 1919. This dredge was sold to the United States Engineer Office, Philadelphia, Pa., and turned over to representatives of that office November 7, 1919, and left the Isthmus for Philadelphia under tow of the Navy collier *Vulcan* December 11, 1919.

There were four tugboats in the dredging service on July 1, 1919. During the fiscal year three were loaned to this division between March and July, 1920, by other divisions, and at the end of the fiscal year there were seven tugboats in the service.

A total of 14 launches was operated during the year.

The following table shows the number of days the dredges were retired from dredging service for repairs, alterations, or on detached service:

TABLE NO. 1.—Number of days dredges were retired from dredging service.

Dredge.	Type.	Days out of service.	Cause.	Remarks.
Paraiso.....	15-yard dipper....	42	Repairs.	Tied up (not working) 96 days.
Gamboa.....	do.....	29	do.....	Tied up (not working) 163 days.
Cascadas.....	do.....	89	do.....	Tied up (not working).
Corozal.....	Seagoing ladder.....	44	do.....	Tied up (not working) 51 days.
Marmot.....	French ladder.....	19	do.....	Tied up (not working) 146 days.
No. 83.....	22-inch pipe-line suction.....	30	do.....	Tied up (not working) 164 days.
No. 84.....	do.....	90	do.....	Tied up (not working) 2 days.
No. 86.....	do.....	155	do.....	Tied up (repairs to relay) 4 days.

DREDGING.

Dredges operating in the Canal prism, at the Atlantic and Pacific terminals, and in the sand and gravel service, removed a total of 4,750,686 cubic yards of material.

The following table, divided into Canal prism and auxiliary dredging, shows the output of each dredge during the year, with the total and unit costs of same:

TABLE NO. 2.—Output of all dredges, with total and unit costs.

Dredges.	Months worked.	Canal prism dredging.				
		Earth.	Rock.	Total.	Cost.	Unit cost.
Dipper:						
Paraiso.....	9	429,785	429,425	859,210	\$380,221.93	\$0.44252
Gamboa.....	7	204,600	334,250	538,850	300,593.34	.55784
Cascadas.....	10	266,650	414,700	681,350	257,330.84	.37768
Total.....		901,035	1,178,375	2,079,410	938,146.11	.45116
Ladder:						
Marmot.....	7					
Total.....						
Suction:						
No. 83.....	5½	423,100		423,100	67,691.48	.15999
No. 84.....	10	635,600	8,500	644,100	119,405.45	.18538
No. 86.....	9	528,200	37,000	565,200	96,902.12	.17145
Total.....		1,586,900	45,500	1,632,400	283,999.05	.17398
Grand total.....		2,487,935	1,223,875	3,711,810	1,222,145.16	.32926

TABLE NO. 2.—Output of all dredges, with total and unit costs—Continued.

Dredges.	Month worked.	Auxiliary dredging.				
		Earth.	Rock.	Total.	Cost.	Unit cost.
Dipper:						
Paraiso.....	9	33,500	54,650	88,150	\$37,653.54	\$0.42715
Gamboa.....	7	24,900	125,200	153,100	51,178.41	.33948
Cascadas.....	10	220,800	10,000	230,800	154,049.40	.66746
Total.....		279,200	192,850	472,050	242,881.35	.51452
Ladder:						
Marmot.....	7	134,826	.....	134,826	76,204.28	.56520
Total.....		134,826	.....	134,826	76,204.28	.56520
Suction:						
No. 83.....	5½	500	.....	500	1,478.50	2.95700
No. 84.....	10	217,500	.....	217,500	37,462.39	.17224
No. 86.....	9	214,000	.....	214,000	40,902.03	.19113
Total.....		432,000	.....	432,000	79,842.92	.18482
Grand total.....		846,026	192,850	1,038,876	398,928.55	.38401

Dredges.	Months worked.	Canal prism and auxiliary dredging.				
		Earth.	Rock.	Total.	Cost.	Unit cost.
Dipper:						
Paraiso.....	9	463,285	484,075	947,360	\$417,875.47	\$0.44109
Gamboa.....	7	229,500	462,450	691,950	351,771.75	.50838
Cascadas.....	10	487,450	424,700	912,150	411,380.24	.45100
Total.....		1,180,235	1,371,225	2,551,460	1,181,027.46	.46288
Ladder:						
Marmot.....	7	134,826	.....	134,826	76,204.28	.56520
Total.....		134,826	.....	134,826	76,204.28	.56520
Suction:						
No. 83.....	5½	423,600	.....	423,600	69,169.98	.16329
No. 84.....	10	853,100	8,500	861,600	156,867.84	.18207
No. 86.....	9	742,200	37,000	779,200	137,804.15	.17685
Total.....		2,018,900	45,500	2,064,400	363,841.97	.17625
Grand total.....		3,333,961	1,416,725	4,750,686	1,621,073.71	.34123

NOTE.—Dredging costs in the above table do not include costs of mining 13,814 cubic yards of rock by drill boat *Torpedo No. 2*, which amounted to \$26,655.86, at the Pacific entrance, as this material was not handled by dredges during the fiscal year.

Dredging costs in the above table include the cost of mining 30,587 cubic yards of rock drilled and blasted the previous fiscal year at a cost of \$44,881.11, and 33,283 cubic yards of rock mined during the present fiscal year at a cost of \$9,912.69.

Dredging costs in the above table do not include cost of grading, ditching, and sluicing Gaillard Cut, which amounted to \$103,970.66.

While the preceding table shows the actual cost of the yardage removed, the cost of the total yardage handled by dredges would be a trifle less, as there were 35,000 cubic yards of material rehandled for which no credit was taken upon second handling.

With the exception of dredges *Nos. 84, 86, and Marmot*, costs are for materials placed on the dump. Costs of dredge *Marmot* are for sand and gravel delivered alongside the gravel dock at Gamboa, and of dredges *Nos. 84 and 86* for material delivered to relay pumps. The pipe lines were 5,200 feet from the dredge to the outfall at Balboa and 5,100 feet at Cucaracha slide.

The following tables show the monthly output of all dredges, exclusive of the sand and gravel output, by geographical districts:

TABLE NO. 3.—Yardage removed from the -42-foot mean sea-level contour in the Atlantic Ocean to Gamboa.

Month and year.	Canal prism.			Auxiliary.			Grand total.
	Earth.	Rock.	Total.	Earth.	Rock.	Total.	
1919.							
July.....	7,400	.....	7,400	4,500	2,500	7,000	14,400
August.....	.....	.....	.....	29,000	52,150	81,150	81,150
September.....	.....	.....	.....	15,900	79,500	95,400	95,400
October.....	.....	.....	.....	9,000	48,700	57,700	57,700
November.....	.....	.....	.....	.....	.....	.....	.....
December.....	.....	.....	.....	2,900	.....	2,900	2,900
1920.							
January.....	.....	.....	.....	1,800	.....	1,800	1,800
February.....	.....	.....	.....	2,450	.....	2,450	2,450
March.....	.....	.....	.....	.....	.....	.....	.....
April.....	.....	.....	.....	.....	.....	.....	.....
May.....	.....	.....	.....	.....	.....	.....	.....
June.....	.....	.....	.....	7,000	.....	7,000	7,000
Total.....	7,400	.....	7,400	72,550	182,850	255,400	262,800

TABLE NO. 4.—Yardage removed from Gaillard Cut, Gamboa to Pedro Miguel locks.

Month and year.	Canal prism.			Auxiliary.			Grand total.
	Earth.	Rock.	Total.	Earth.	Rock.	Total.	
1919.							
July.....	8,000	6,300	14,300 ¹	.....	.....	.....	14,300
August.....	.....	.....	.....	.....	.....	.....	.....
September.....	30,000	8,125	38,125	.....	.....	.....	38,125
October.....	71,600	67,250	138,850	.....	.....	.....	138,850
November.....	154,335	63,500	217,835	.....	.....	.....	217,835
December.....	119,600	54,000	173,600	.....	.....	.....	173,600
1920.							
January.....	30,300	42,700	73,000	.....	.....	.....	73,000
February.....	24,800	62,500	87,300	.....	.....	.....	87,300
March.....	92,800	171,000	263,800	.....	.....	.....	263,800
April.....	135,200	162,700	297,900	.....	.....	.....	297,900
May.....	132,700	295,200	427,900	.....	.....	.....	427,900
June.....	120,500	268,600	389,100	1,500	.....	500	389,600
Total.....	919,835	1,201,875	2,121,710	500	.....	500	2,122,210

¹ 300 cubic yards of this amount, salvaged coal from sunken barge No. 226; 200 cubic yards of earth wasted on bank of canal.

TABLE NO. 5.—Yardage removed, Pedro Miguel locks to the -45-foot mean sea-level contour in the Pacific Ocean.

Month and year.	Canal prism.			Auxiliary.			Grand total.
	Earth.	Rock.	Total.	Earth.	Rock.	Total.	
1919.							
July.....	144,800	18,000	162,800	132,800	10,000	142,800	305,600
August.....	146,800	.....	146,800	139,200	.....	139,200	286,000
September.....	46,600	.....	46,600	56,700	.....	56,700	103,300
October.....	137,500	.....	137,500	6,100	.....	6,100	143,600
November.....	190,000	.....	190,000	.....	.....	.....	190,000
December.....	270,000	.....	270,000	25,300	.....	25,300	295,300
1920.							
January.....	116,100	.....	116,100	47,100	.....	47,100	163,200
February.....	116,000	.....	116,000	92,000	.....	92,000	208,000
March.....	73,900	.....	73,900	61,100	.....	61,100	135,000
April.....	120,000	.....	120,000	80,000	.....	80,000	200,000
May.....	121,000	4,000	125,000	.....	.....	.....	125,000
June.....	78,000	.....	78,000	12,000	.....	12,000	90,000
Total.....	1,560,700	22,000	1,582,700	652,300	10,000	662,300	2,245,000

THE PANAMA CANAL.

DREDGING CANAL PRISM.

Dredges were at work throughout the year dredging and maintaining the Canal channel in Gatun Lake, Gaillard Cut, and the Pacific entrance, excavating a total of 3,711,810 cubic yards of construction and maintenance yardage, as shown in the following table:

TABLE NO. 6.—*Number of cubic yards removed from the Canal prism.*

Location.	Construction.	Maintenance.	Total.
Atlantic entrance.....	.....	.....	.....
Gatun Lake.....	.....	7,400	7,400
Gaillard Cut.....	.....	2,121,710	2,121,710
Miraflores Lake.....	.....	.....	.....
Pacific entrance.....	17,800	1,564,900	1,582,700
Total Canal prism.....	17,800	3,694,010	3,711,810

At the close of the fiscal year ending June 30, 1920, there remained to be removed from the Canal prism, including siltage, slides, and original material, 2,604,100 cubic yards of earth and 682,800 cubic yards of rock.

The following table shows the classification and location of all yardage remaining to be removed from the Canal prism on June 30, 1920:

TABLE NO. 7.—*Yardage remaining to be removed from the Canal prism.*

Location.	Construction.			Maintenance.			Grand total.
	Earth.	Rock.	Total.	Earth.	Rock.	Total.	
Atlantic entrance.....	.....	.....	.....	825,000	.....	825,000	825,000
Gatun Lake.....	.....	.....	.....	155,000	.....	155,000	155,000
Gaillard Cut.....	.....	25,000	25,000	566,000	450,000	1,016,000	1,041,000
Miraflores Lake.....	.....	.....	.....	175,000	.....	175,000	175,000
Pacific entrance.....	47,500	82,900	130,400	835,600	124,900	960,500	1,090,900
Total.....	47,500	107,900	155,400	2,556,600	574,900	3,131,500	3,286,900

It is estimated that during the present fiscal year ending June 30, 1921, the following shoaling will occur in the Canal prism:

Location.	Earth.	Rock.	Total.
Atlantic entrance.....	200,000	.....	200,000
Gaillard Cut.....	1,000,000	700,000	1,700,000
Pacific entrance.....	1,100,000	.....	1,100,000
Total.....	2,300,000	700,000	3,000,000

Work under the project at Miraflores P. I. to widen the channel by cutting off the point of land on the west bank just south of Miraflores locks, was continued during the year. Forty-nine thousand one hundred cubic yards of earth and rock were removed, making the total earth and rock excavated to July 1, 1920, 486,300 cubic yards. The total estimated quantities to complete this project are 20,600 cubic yards of earth and 124,900 cubic yards of rock.

The work of widening the channel at Paraiso P. I. to give a better and more easy approach to the north end of the Pedro Miguel locks, was completed during the year. In this work, 93,900 cubic yards of earth and rock were excavated, making a total of 460,500 cubic yards of earth and rock removed.

Of the material removed from Gaillard Cut 18 per cent was from Culebra slide, 77 per cent from Cucaracha slide, 4 per cent from Paraiso P. I. improvement work, and 1 per cent from miscellaneous dredging.

The following table shows the distribution of all material removed from Gaillard Cut during the year, and also the grand total removed by dredges to June 30, 1920:

TABLE No. 8.—*Distribution of material removed from Gaillard Cut.*

Location.	Fiscal year.			Total to date.		
	Earth.	Rock.	Total.	Earth.	Rock.	Total.
Gamboa Dike.....				23,856	59,595	83,361
Tower "R" incline.....					83,595	83,595
Haut Obispo slide, west.....				3,235		3,235
Buena Vista slide, west.....				5,470		5,470
Buena Vista slide, east.....				2,300	3,669	5,969
Cascadas slide, east.....				2,525	32,670	35,195
Whitehouse slide, east.....				9,928	17,132	27,060
Powderhouse slide, east.....				39,768	57,952	97,760
La Pita (lower) slide, east.....					59,803	59,803
Empire slide, east.....				28,745	212,217	240,962
Division office slide, west.....					6,280	6,280
Lirio slide, west.....				7,290	81,780	89,070
Culebra, new slide, east and west ¹	255,235	129,575	375,810	2,032,234	22,165,876	24,198,110
Culebra, old slide, east and west ²				28,419	1,061,357	1,089,786
Contractor's Hill, north.....				13,800	139,600	153,400
65-foot berm, west.....					73,430	73,430
Cucaracha slide, east.....	633,600	995,200	1,628,800	2,110,066	5,382,616	7,492,682
Contractor's Hill slide, west.....				7,900	31,600	39,500
Paraiso incline, east.....					20,300	20,300
Paraiso P. I., west.....	20,800	73,100	93,900	73,700	386,800	460,500
Pedro Miguel slide, east.....				1,956	7,254	9,210
Miscellaneous ³	10,200	13,000	23,200	2,863,778	179,890	3,043,668
Total.....	919,835	1,201,875	2,121,710	7,251,910	30,051,187	37,309,127

¹ Since Oct. 14, 1914.² Prior to Oct. 14, 1914.³ Small slides and fills in the Canal.

Culebra slides have been fairly quiescent during the last fiscal year except during the latter part of October, 1919, when East Culebra became active. From October 16 to December 27, 1919, 272,000 cubic yards were removed from in front of this slide. The channel was maintained at all times and no delays to shipping occurred. There have been removed from Culebra slides to date 25,287,896 cubic yards of material and it is estimated that 750,000 cubic yards more will have to be removed before the slides become permanently quiescent.

Cucaracha slide, extending from the south side of Gold Hill to the north face of Purple Rock, reaching from the Canal eastward for 2,500 feet, and covering an area of 33 acres, became active on October 3, showing a general movement and shoaling within the Canal proper between stations 1805+00 and 1815+00. On February 22 the slide again moved into the Canal and has continued for the last five months. The width and depth of the channel in front of this slide varied from time to time over this period. At one time the channel was reduced to a depth of 15 feet over a width of 60 feet. This closed the Canal to all shipping for four days (March 21 to 24, inclusive). A total of 1,628,800 cubic yards of material was removed from this area by dredges during the last fiscal year, making a total removed to date 7,492,652 cubic yards.

At the close of the fiscal year channel conditions at this point were restored almost to normal.

Drag surveys were made daily in the vicinity of all active slides, and all lumps or shoals found, which were considered a menace to navigation, were removed by the dredges before shipping was allowed to pass.

DUMPS.

All of the spoil from Gaillard Cut and Gatun Lake was disposed of on dumps located in Gatun Lake near mile post 24, north of Mamei curve, with the exception of 43,850 cubic yards dumped in the Canal north of Gold Hill, 70,900 cubic yards deposited in the Canal by pipe-line dredges south of Cucaracha slide, and 58,200 cubic yards which were pumped through a pipe line into the Rio Grande Valley. There was a total of 1,991,160 cubic yards of material deposited on the Gamboa dumps during the year.

The material excavated in the Pacific entrance, including Miraflores P. I. improvement work, was deposited in San Juan fill; on the flats along the west bank of the Canal; on the Arsenal fill; in the Rio Grande east diversion; on the flats north of the Arsenal fill; and in the sea dump located to the westward of the Canal entrance in Panama Bay. There were 431,100 cubic yards deposited in San Juan fill, 597,300

cubic yards on flats west of Canal, 207,000 cubic yards on the Arsenal fill, 51,000 cubic yards on the flats north of the Arsenal fill, 275,000 cubic yards in the Rio Grande east diversion, and 21,300 cubic yards in the sea dumps, making a total deposit of 1,582,700 cubic yards.

SUBAQUEOUS ROCK EXCAVATION.

During the year 1,233,875 cubic yards of hard and soft rock were removed from the Canal prism and Balboa Harbor, as follows: 120,575 cubic yards from Culebra slides, 995,200 cubic yards from Cucaracha slide, 13,000 cubic yards south of Cucaracha slide, 73,100 cubic yards from Paraiso P. I. improvement work, 18,000 cubic yards of unmined rock from Miraflores P. I. improvement work, 4,000 cubic yards from the Pacific entrance, and 10,000 cubic yards from Balboa Inner Harbor.

Of these amounts, 33,283 cubic yards were drilled and blasted by drill boat *Teredo No. 2* this fiscal year, and 30,587 cubic yards drilled and blasted at the Paraiso P. I. last year. There are still 43,770 cubic yards drilled and blasted but not dredged, 30,029 cubic yards of which are at Miraflores P. I., and 13,741 cubic yards in the Pacific entrance; 73 cubic yards of the first amount and all of the latter were drilled and blasted by drill boat *Teredo No. 2* this fiscal year. There were 72,045 pounds of dynamite used during the year by the *Teredo No. 2* and by dredges in doying large rocks at Paraiso P. I. and Cucaracha slide.

The following table shows the location, feet drilled, area covered, theoretical breakage, and cost of all rock mined by the *Teredo No. 2*:

TABLE NO. 9.—Performance of drill boat "*Teredo No. 2*."

Month and year.	Location.	Number holes.	Total feet drilled.	Powder (number pounds).	Area (square yards).	Breakage (cubic yards).	Cost.	Unit cost.
1919.								
July.....	Paraiso, P. I., 1900+10 to 1901+70 W.	459	5,021	14,647	16,324	6,695	\$9,813.15	\$1.4657
August.....	Paraiso, P. I., 1901+70 to 1904+10 W.	582	5,805	15,556	20,952	7,738	11,353.71	1.4673
September..	Paraiso, P. I., 1904+10 to 1905+70 W.	125	1,431	4,210	4,500	1,907	2,856.25	1.4978
	Total, Paraiso, P. I. .	1,166	12,257	34,413	41,976	16,340	24,023.11	1.4702
	Pacific entrance, 2088+50 to 2101+50 W.	11	55	132	396	73	163.83	2.2442
September..	Pacific entrance, 2297+50 to 2299+10 E.	245	1,936	5,227	8,820	2,580	5,790.65	2.2444
October.....	Pacific entrance, 2299+10 to 2300+70 E.	487	4,783	12,644	17,532	6,375	11,739.74	1.8415
November..	Pacific entrance, 2290+90 to 2301+50 W.	517	3,591	9,370	18,612	4,786	8,961.64	1.8725
	Total, Pacific entrance.	1,260	10,365	27,373	45,360	13,814	26,655.86	1.9296
1920.								
March.....	Cucaracha slide, 1805+00 to 1809+00 E. and W.	24	380	1,650	1,176	690	3,348.63	4.8531
April.....	Cucaracha slide, 1806+00 to 1811+00 E. and W.	35	541	2,320	1,260	7,210	5,053.57	.7009
May.....	Cucaracha slide, 1805+00 to 1811+00 E. and W.	19	260	1,010	1,391	7,638	5,541.92	.7256
June.....	Cucaracha slide, station 1805+00 E. and W.	11	145	675	1,000	1,405	1,945.46	1.3846
	Total, Cucaracha slide.	89	1,326	5,655	4,827	16,943	15,889.58	.93783
	Totals for year.....	2,515	23,948	67,441	92,163	47,097	66,568.55	1.41343

MISCELLANEOUS DREDGING.

Atlantic terminals.—During the year 58,400 cubic yards of earth and 182,850 cubic yards of rock were removed from the Atlantic terminals as follows: 2,650 cubic yards of earth and 7,850 cubic yards of rock removed from the approach channel extension; 50,200 cubic yards of earth and 168,000 cubic yards of rock from the extension to the west coaling station slip; and 5,550 cubic yards of earth and 7,000 cubic yards of rock from the slips north and south of Pier No. 6.

There have been no dredging operations at Coco Solo during this fiscal year.

All of this material, a total of 241,250 cubic yards, was dumped between the land end of the east breakwater and Margarita Point.

Pacific terminals.—During the fiscal year 558,700 cubic yards of earth and 10,000 cubic yards of rock were removed from Balboa Inner Harbor, 53,500 cubic yards of earth from in front of Dock No. 6, and 40,100 cubic yards of earth from in front of Dock No. 7.

This material was disposed of as follows: 220,400 cubic yards of earth, excavated by a pipe-line dredge with one relay, through a pipe line 4,750 feet long, were deposited on the Diablo dump "A"; 119,000 cubic yards of earth in the San Juan fill; 92,100 cubic yards of earth on the flats west of the Canal; and 220,800 cubic yards of earth and 10,000 cubic yards of rock were towed to sea and deposited on the sea dump.

SAND AND GRAVEL PRODUCTION.

The sand and gravel necessary for construction purposes were excavated by the French ladder dredge *Marmot* in the gravel beds of the Chagres River opposite Juan Mina, about 5 miles above Gamboa. There were excavated by this dredge and delivered to the Gamboa handling plant 104,749 cubic yards of run-of-bank gravel and 15,927 cubic yards of washed sand. There were also 13,100 cubic yards of mud removed to uncover the gravel beds and 1,050 cubic yards of mud removed in front of Gamboa gravel dock. This total of 14,150 cubic yards of mud was dumped in deep water in the Chagres River. The following amounts of sand and gravel were on hand in stock at Gamboa July 1, 1920: 1,449 cubic yards of sand, 25,038 cubic yards of No. 1 gravel, 4,296 cubic yards of No. 2 gravel, and 51,899 cubic yards of run-of-bank gravel. There were shipped during the year 39,261 cubic yards of sand, 57,093 cubic yards run-of-bank gravel, 34,992 cubic yards No. 2 gravel, making a total of 131,346 cubic yards.

DRAINAGE.

Ditches were excavated at West Culebra and Barge Repair slides, East and West Lirio, and Cucaracha by the hydraulic graders to prevent water from standing in the areas.

SLIDE INSPECTION AND REPORTS.

Inspections were made of all slide areas from time to time, new breaks reported, and drainage conditions noted.

MINDI DIKES AND GROINS.

The rock and timber dikes and groins along Mindi Beach, south of Limon Bay, were maintained throughout the fiscal year. No new dikes or groins have been constructed, and only minor repairs have been necessary to those previously built.

WATER HYACINTHS.

Regular monthly inspections were made of the waters of the Canal, Gatun Lake, and tributaries. All the scattering hyacinths were pulled, but most of those in beds were destroyed by spraying with a solution of arsenic and soda.

During the year 2,500,000 plants of the floating variety were pulled and deposited on shore and 403,500 square yards of hyacinths were destroyed by spraying with the arsenic solution. Log booms placed in the upper reaches of the Pescado River, to keep the channel navigable for small boats, were maintained. Log booms were also placed and maintained at the mouths of the Mandingo and Chagres Rivers to keep the hyacinths from being washed into the Canal by freshets.

The floating variety has made its appearance in Canal Zone waters for the first time during this fiscal year. This is a much harder variety than the anchored kind to control.

SURVEYS.

The usual progress surveys were made of the dredged areas in the Canal prism, Cristobal Harbor, Gatun Lake, Gaillard Cut, and Balboa Inner Harbor. The Gatun Lake, Margarita, and Pacific sea dumps were surveyed and charted. Two topographical surveys of Cucaracha slide area were made and plotted. Borings were made of the proposed area for a ferry landing at Mindi, and rock exploration surveys were made in front of the reloader wharf and along the west prism line, between stations 2286+00 and 2307+00, at Balboa. All surveys, estimates, and plans of all dredging and mining projects proposed during the year were prepared. Dump inspection in Gatun Lake section and at the Pacific and Atlantic entrances was maintained during dredging operations in those localities.

OFFICE.

All clerical work, preparation of progress records, estimates, requisitions, etc., were satisfactorily performed during the year.

ELECTRICAL DIVISION.

The details of the operations of the electrical division during the fiscal year are covered in the report of the electrical engineer, which follows:

ELECTRICAL DIVISION.

W. L. Hersh, Electrical Engineer.

ORGANIZATION AND PERSONNEL.

The personnel, as recorded in last year's report, was continued throughout the year, with the exception that Mr. Carl W. Markham, who returned from military service, was reinstated in his former position of electrical recorder effective November 1, 1919, and Mr. M. P. Benninger was assigned to other duty. The six subdivisions into which the work of this division is divided are listed as follows:

Power and transmission system, B. R. Grier, superintendent.

Construction and maintenance, A. C. Garlington, superintendent.

Telephones and telegraphs, C. L. Bleakley, supervisor.

Railway signal system, E. C. McDonald, supervisor.

Designing and estimating, W. T. O'Connell, estimator and designer.

Office and requisitions, C. W. Markham, electrical recorder.

In this division there were 248 gold and 288 silver employees at work during the last week of June, 1920. The average monthly pay roll was \$65,300.

CHARACTER AND EXTENT OF WORK.

The duties of the electrical division remained unchanged during the year with the exception in the case of maintaining and charging of storage battery cargo handling trucks at the Cristobal terminal docks, which activity was taken over March 15, 1920, by the receiving and forwarding agent of the Panama Railroad. The principal functions comprising the activities of the electrical division are the operating and maintaining the steam and hydroelectric power plants, substations, transmission lines, and power-distribution systems; the maintenance of street, shop, dock, public building, and residence lighting systems; the maintenance of telephone, telegraph, fire alarm, and railway signal systems and railway interlocking plants, charging and maintaining of storage battery cargo handling trucks at the Pacific terminal docks and warehouses; and the installation and maintenance of such electrical equipment as required by other divisions of the Canal or other departments of the Government, and by such commercial vessels as might require this class of work while transiting the Canal.

The handling of the foregoing work required the issuing of a total of 4,785 work orders, with the attendant reports, estimates, and miscellaneous correspondence. There was prepared a total of 25 requisitions for material, which included specifications for 2,113 items, and totaling in estimated value \$824,352.

The total expenditure of the division for the year was approximately \$1,700,000, of which 1½ per cent was for work performed for other departments of the Government, 6 per cent was for exterior electrical work at Fort Clayton and Fort Davis, 9 per cent was for improvements to the power system, 10 per cent was for work performed for outside interests, 24 per cent was for work and power for the Panama Railroad, 46 per cent was for work and current for other departments of the Canal, and the balance of about 3½ per cent covered stock of materials, some equipment purchases, and work in progress awaiting completion and rendering of billing.

The work of checking and mapping of duct lines and of preparing feeder-connection diagrams of the underground distribution system, as mentioned in last year's report, was continued when other activities permitted and was advanced to a state of about 60 per cent completion by the end of June.

POWER-SYSTEM EQUIPMENT AND IMPROVEMENTS.

The installations of major equipment of the power system as existing at the end of last year remained unchanged throughout the year. Any improvements or changes which have been undertaken have been of a secondary nature and are briefly summarized as follows:

At the Gatun hydro-electric station a small amount of preliminary work was accomplished in preparation for the installation of Unit No. 5. Part of the switchboard and oil switch equipment pertaining to this unit arrived during the later months of the year, but the actual work of installation has not been started.

The unit proper, consisting of generator, turbine, and governor, was originally placed on a proprietary requisition from the respective manufacturers of Unit No. 1. However, on account of the high price quoted by the contractor for the turbine and governor, it was decided to cancel the original requisition covering the unit proper, and to prepare new specifications in order that same might be put out on a competitive bid basis. This required a complete set of detail drawings of the turbine and governor, which are well under way at the present time, and upon the completion of which the new requisition will be placed.

About the middle of February the 2,200-6,600 volt autotransformer of Unit No. 2 at the Gatun hydroelectric station failed in service, due to burn-out between turns of the winding. Several coils were replaced, and transformer was returned to service, only to fail again in other coils during the early part of May, making it necessary to place cablegram requisition for a complete set of new coils for this autotransformer. Awaiting the delivery of these new coils, No. 2 generator has been placed in 2,200-volt service, under which conditions it can be operated at about three-quarter capacity.

During the dry season, when Miraflores steam station was placed in service, it was found convenient to clean and paint head gates, trash racks, and valve guides at the hydroelectric station. An inspection of the bitumastic enameling on the inside of penstocks made at the same time showed that this enamel was in very good condition.

At the Miraflores steam electric station a 3-inch oil-pipe line was installed in such a manner as to pass through the ash pits for the purpose of heating the heavy grade of fuel oil now being used.

At each of the Gatun, Cristobal, Miraflores, and Balboa substations the work of remodeling storage-battery rooms was completed. New batteries were installed at Gatun, Cristobal, and Balboa, but at Miraflores the battery was completely overhauled by using the better cell materials from the other stations.

At the Cristobal substation two 2,200-volt feeder equipments were installed, using materials recovered from the hydroelectric station. One of these feeder equipments is to be used for a distribution feeder to the new silver townsite at Mount Hope, which is under construction. The second equipment will be used for a feeder to relieve the existing feeders to the Cristobal docks, which would otherwise become overloaded when the new machine shop at the docks will be finished and placed in service.

At Gatun substation additions to equipment consisted of the installation of a 300 KVA 60,000-volt testing transformer for applying high potential tests to the transmission line, and the replacement of the 16-ton manually operated chain hoist by a 30-ton motor-operated chain hoist, this change being preparatory to the handling and installing of an 8,400 KVA 44,000-6,600-volt water-cooled transformer now on requisition for this substation.

At Balboa and Cristobal substations the originally installed 800-ampere bus tie switches were replaced by switches of 1,000-ampere capacity, which were recovered from the hydroelectric station. Also at the Balboa substation there were installed two 2,200-volt feeder equipments for future needs, using materials recovered from the hydroelectric station.

During the dry season an endeavor was made to anticipate the deterioration of porcelain insulators in service on transmission line, and as a result of these tests a total of 1,915 insulator disks were marked for removal. By the end of June 902 of these insulators had been replaced. During the dry season all transmission line steel towers and also the strain fixtures on all substation roofs were given a complete coat of gray paint.

OPERATION OF POWER SYSTEM.

The power system was operated throughout the year with an average combined generator output of 5,382,750 kilowatt hours a month, as compared with an average combined generator output of 4,725,637 kilowatt hours a month last year. There was an average of 4,608,341 kilowatt hours a month transmitted and distributed to all power consumers this year as compared with a corresponding average of 3,955,607 kilowatt hours a month last year. From the above there results a power system transmission and distribution loss of 14.4 per cent this year, as compared with a corresponding loss of 16.3 per cent last year.

During the dry season months of March, April, and May it was found advisable to conserve the water stored in Gatun Lake, and for this reason the hydroelectric station at Gatun was relieved of a load ranging from 3,000 to 4,000 kilowatts. For the three-month period this load was carried by the steam-power plant at Miraflores, during which period this plant generated 8,234,380 kilowatt hours, and consumed 47,040.14 barrels (42-gallon) of fuel oil. During the remaining nine months of the year the steam plant was maintained on the basis of stand-by service, for which the average rate of fuel consumption was 2,311 barrels a month, as compared with a corresponding rate of 2,515 barrels a month last year.

On the transmission line there were a total of 11 interruptions in service from all causes, as compared with a corresponding total of 49 last year. Of this total, 1 interruption was chargeable to insulator failure, as compared with 32 last year. This improvement in service is attributable to the fact that an additional insulator disk was added to all insulator strings and to the testing and weeding out of 1,475 insulator disks, as mentioned in report for last year.

The average cost of distributed power for the year was 9.421 mills a kilowatt hour, as compared with a corresponding cost of 8.097 mills last year. The average cost of distributed lighting current, including lamp renewals, was 13.277 mills a kilowatt hour this year, as compared with a corresponding cost of 12.963 mills last year. These increases in the unit costs of power and lighting current have been caused largely by the revision of the reserve for depreciation account and the fact that the Miraflores steam station was pressed into service during three months of the dry season.

The following tabulation shows, by months, the combined generator output at the Gatun and Miraflores generating stations; also the power distributed to all consumers and the percentage of power lost between generators and the consumers:

Month.	Combined generator output.		Total distributed power.	System losses, including excitation, auxiliaries, transmission, and transformation.
	Gatun hydro station.	Miraflores steam station.		
1919.				
July.....	<i>Kilowatt hours.</i> 5,228,000	<i>Kilowatt hours.</i>	<i>Kilowatt hours.</i> 4,417,078	<i>Per cent.</i> 15.6
August.....	5,422,000	.....	4,584,693	15.5
September.....	5,125,000	.....	4,345,679	15.2
October.....	5,322,000	.....	4,549,394	11.5
November.....	5,128,000	.....	4,365,968	14.75
December.....	5,667,700	.....	4,829,153	14.75
1920.				
January.....	5,894,400	.....	5,006,940	15.1
February.....	5,221,000	.....	4,592,610	13.7
March.....	2,594,200	2,928,590	4,752,618	12.5
April.....	2,132,500	3,005,350	4,597,733	12.1
May.....	3,027,400	2,300,440	4,685,090	12.1
June.....	5,477,400	298,120	4,753,138	16.4
Average this year.....	.....	.....	4,698,341	14.4
Average last year.....	.....	.....	3,955,607	16.3

The following tabulation shows the cost of operation and maintenance of the power system and the unit costs of power in its various stages of distribution. The unit costs are based on the net quantities of power delivered to consumers and not on the gross amounts generated.

	Totals, fiscal year 1920.	Average cost per kilowatt hour.	
		This year.	Last year.
Net power consumption (kwh).....	55,300,094	.....	.....
Costs of operation and maintenance:			
Gatun hydroelectric station.....	\$48,771.71	\$0.0008819	\$0.001053
Miraflores steam-electric station.....	142,100.61	.0025696	.002381
Transformer substations.....	82,146.13	.0014854	.001597
High-tension transmission lines.....	16,797.25	.0003037	.000528
Distribution lines.....	31,161.59	.0005634	.000502
Depreciation, power system.....	195,000.00	.0035262	.002022
Reserve for repairs.....	5,000.00	.0000904	.000000
Total costs distributed power.....	520,977.29	.0094206	.008083
Net consumption lighting current (kwh).....	13,986,878	.....	.....
Cost, maintenance, lighting system, including lamp renewals.....	\$53,939.83	\$0.0038564	\$0.004880
Cost of lighting current per kilowatt hour.....	.....	.013277	.012363

GATUN SPILLWAY.

The operation and maintenance of the Gatun spillway was performed by the forces of the electrical division throughout the year. There were no failures of equipment and no operating difficulties were experienced. There was a total of 153 gate operations, 126 of which were for regulation of lake level and the remaining 27 were for

inspection and miscellaneous reasons. During the dry season all railings about the spillway were cleaned and painted, and all structural steel and other metal parts were painted where necessary. The building division installed steel apron plates on four baffle piers during the dry season.

TELEPHONE AND TELEGRAPH SYSTEMS.

The electrical division continued to operate and to maintain the telephone system and to maintain the telegraph system of the Panama Railroad Company throughout the year.

During the year 999 telephones were installed, and 636 telephones were removed, leaving a total of 3,330 telephones in service at the end of June, 1920, representing an increase of 363 telephone installations for the year.

The average number of telephone calls during the eight-hour business day, as determined by peg count, was about 28,900 calls, representing a rate of 3,600 telephone calls an hour, as compared with corresponding figures of 22,630 calls a day and a rate of 2,829 telephone calls an hour last year.

During the year 15,114 feet of lead-covered paper-insulated telephone cable of all sizes, varying from 5 to 200 pair, were installed, resulting in a total installation of 642,448 feet of cable in service at the end of June, 1920. On this entire cable installation there occurred 13 cases of cable trouble as compared with 12 cases of trouble last year.

The following outline of telephone statistics has been compiled in a condensed form to show the growth of telephone equipment and installations during the past year as compared with previous years.

Canal Zone telephone system.

	June 30, 1916.	June 30, 1917.	June 30, 1918.	June 30, 1919.	June 30, 1920.
Miles of pole line.....	51	43	38	36	38
Miles of underground conduit:					
Panama Railroad.....	212	212	212	212	212
Panama Canal, occupied by Panama Railroad...	10	20	26	34	36
Total miles of conduit.....	222	232	238	246	248
Miles of cable:					
In duct.....	79	101	111	118	120
Aerial.....	9	2	2	2	2
Total miles of cable.....	88	103	113	120	122
Miles of wire:					
In duct.....	8,282	9,989	11,457	11,856	12,960
In submarine cable.....	26	55	55	55	55
In aerial cable.....	470	124	124	121	124
Bare and insulated, aerial lines.....	522	598	515	526	550
Total.....	9,300	10,676	12,151	12,561	13,689
Miles of wire:					
Trunk circuits.....	2,002	2,810	4,040	4,259	4,588
Subscribers' circuits.....	7,048	7,561	7,753	7,898	8,605
Telegraph circuits.....	250	305	358	404	496
Total.....	9,300	10,676	12,151	12,561	13,689
Miles of phantom circuits.....	576	576	576	672	768
Miles of simplex circuits.....	96	96	96	132	132
Total.....	672	672	672	804	900
Telephone exchanges:					
Panama Railroad.....	16	10	9	9	10
Panama Canal.....	3	3	3	3	3
Army and Navy.....	10	10	10	10	9
Total.....	29	23	22	22	22
Telephones:					
Panama Railroad.....	1,878	2,154	2,523	2,967	3,330
Panama Canal.....	104	110	114	114	120
Army and Navy.....	400	578	670	703	707
Total telephones.....	2,382	2,842	3,307	3,784	4,157
Exchange connections daily ¹	12,165	17,801	21,816	21,415	22,503
Trunk connections daily ¹	2,954	3,241	3,921	6,396	7,244
Total.....	15,119	21,042	25,740	27,811	29,747

¹ Exchange and trunk connections are those handled in the four main exchanges only.

FIRE-ALARM SYSTEM.

The work of inspecting and maintaining the fire-alarm system has been continued under the supervision of the telephone subdivision. Two new fire-alarm boxes were installed on pier No. 6 at Cristobal, and two existing fire-alarm boxes were relocated at Mount Hope. Old fire-alarm box supports were replaced by standard iron posts at two locations in Cristobal and at two locations in Balboa.

At the Balboa fire station a new loop-distributing board was installed and the terminal wiring was rearranged. In the Balboa district it was necessary to reroute about 3,000 feet of two-conductor fire-alarm cable.

There were 27 alarms turned in, and no failure of any alarm apparatus occurred during the year.

RAILWAY-SIGNAL SYSTEM.

There were practically no changes made in the installation of railway signals during the year. Considerable maintenance work was found necessary in reinsulating splices in underground signal cables.

There were 2,262,937 registered arm movements with 149 responsible signal failures compared to 2,081,908 arm movements and 97 responsible signal failures last year, and 2,401,176 arm movements and 131 responsible failures for the year ended June 30, 1918. There was an average of 15,187.5 arm movements per responsible signal failure compared to 21,495 last year, and 18,352 for the year ended June 30, 1918. Counting only available signal failures there were 44,371 arm movements per signal failure. There were 547 train minutes delay this year compared to 181 minutes last year, and 556 minutes for the year ended June 30, 1918. There was an average delay of 4 minutes per train for each signal failure.

There was one reported false clear aspect and one false caution aspect during the year on the entire signal system. The false clear aspect occurred September 12, 1919, on signal No. 239, due to sweating relay box and possibly leaky door on relay box. The false caution aspect occurred in December, 1919, and was caused by a broken slot to rgle which was discovered by a signal maintainer who was at the signal when it occurred.

The responsible and nonresponsible signal failures, arm movements, and train minutes delay for each month during the year are outlined in the following tabulation:

Month.	Signal failures.			Total arm movements.	Delay train minutes.
	Responsible.		Nonre-sponsible.		
	Avoidable.	Unavoid-able.			
1919.					
July.....	10	7	2	194,960	13
August.....	1	.....	1	197,483	10
September.....	2	4	1	180,014	28
October.....	2	9	4	183,316	23
November.....	3	2	1	171,716	5
December.....	5	15	5	180,300	115
1920.					
January.....	7	6	.....	206,248	25
February.....	1	16	.....	223,863	85
March.....	2	22	.....	184,209	122
April.....	10	8	1	195,039	55
May.....	6	2	.....	178,921	40
June.....	2	7	.....	166,838	26
Total.....	51	98	15	2,262,937	547

There was an average of 45.5 train minutes delay and 12.5 responsible signal failures per month.

In the following is tabulated an analysis of the responsible signal failures for each month of the year.

Responsible signal interruptions for fiscal year ending June 30, 1920.

	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Summary.	Per cent.
Loose nut between track wire terminals ¹						1							1	0.7
Track relay disconnected account broken toggle ¹						1							1	.7
Bad relay contact ¹										3		3	6	4.0
Poor or defective track bat. dirty zincs, etc. ¹	1							1	1				3	2.0
Leakage ¹				2									2	1.3
Loose connection on lead-out wire of magnet ¹								3					3	2.0
High-resistance contacts on track relay ¹				1			2	10			1		10	7.6
Broken bond wire ¹													4	2.5
Open switch point ¹							2					2	2	1.3
Switch box cotter broken ¹							2						2	1.3
Broken factory splice in track ¹								2					2	1.3
Open in track resistance unit ¹		2											2	1.3
Open lead on track relay coils ¹	2								1				3	2.0
Track relay high resistance coil ¹				1									1	.7
Switch box out of adjustment ¹	2												2	1.3
Discharged or exhausted storage battery, careless maintenance.....	1				3								4	2.5
Signal light out.....			1						1	5	1		8	5.2
Unknown.....	4		1			4	1			5	3		18	12.0
Loose wire on terminal of signal.....											2		2	1.3
Open coil on signal slot arm.....									2				2	1.3
Open wire from signal to main cable.....	1		1	4			3						9	6.0
Commutator sticking on signal motor, account of dirty brushes, etc.....	2			1			1						4	2.5
Home relay out of adjustment.....										4			4	2.5
Open circuit, broken jumper wire on pole changer.....								2					2	1.3
Signal motor commutator flat.....											1		1	.7
Commutator brushes not properly adjusted.....												1	1	.7
Fuse blown.....	2							1					3	2.0
Open coil on 1,000-ohm repeater relay.....	2												2	1.3
Exhausted primary battery, careless maintenance.....			1				3						5	3.3
Defective primary battery material.....			1	1	2	14	1	10	7	1	1	2	40	27.4
Total.....	17	1	6	11	5	20	13	17	24	18	8	9	149	100

¹ Track circuit defects responsible for 30 per cent of signal failures.

There were two derailments at the interlocking plants during the year. One occurred at Diablo and the other at the pontoon bridge at Paraiso. There were also two derailments at hand-throw pipe-connected derails, one at Mount Hope passing track and one at Tower R, Gamboa.

There were 34 reported signal failures for the year from various causes at the interlocking plants compared to 36 for last year. Of these, 24, or about 70 per cent, occurred at the pontoon bridge. Considerable delays were also reported during the month of January, 1920, in closing the bridge on account of rail wedges not dropping into place. This was caused by the bridge bumping the abutments when opening and closing, thereby throwing the apron girder about 3 to 4 inches out of alignment at the extreme end.

Due to the increased costs of labor and material, the cost of maintaining railway signals has increased about 20 per cent over last year.

MISCELLANEOUS ELECTRICAL WORK.

The principal items of electrical work not otherwise classified or mentioned include the following items:

The addition of 40 lighting standards to the street-lighting systems in Canal Zone towns; the construction of underground distribution and street-lighting systems and the illumination of buildings at Fort Clayton and at Fort Davis; the starting of construction work for the distribution of lighting current to the new silver townsite at Mount Hope; the completion of underground distribution and the equipping of a small motor-driven pumping station at France Field; the extension of auxiliary power circuits for the division of fortification; the installation of a 24-panel switchboard and

seven motor generators and the necessary accessory equipment in the Coco Solo sub-station; the construction of duct line across reclaimed area at New Cristobal and the extension of an existing feeder cable to this area; the installation of a supplementary feeder in Balboa to relieve overloaded feeder cables; the complete rewiring, including the rewinding of all motors for the reconstructed sand and gravel handling cranes at Gamboa; the installation of switchboard, transformers, and motor equipment for the rerolling mill at Balboa; the construction of about a mile of four-cell duct line through Balboa; the placing of 7,200 feet of submarine cable for the beacon-light circuits of the lighthouse subdivision; the installation of water heaters in practically all bachelor quarters in Balboa, Ancon, Pedro Miguel, Gatun, and Cristobal for the supply department; the completion of the underground distribution system and the installation of motor-generator and switchboard equipment in machine shop at the naval air station.

The work at the electrical repair shop, exclusive of the work done in the field or which required men to leave the shop, may be briefly summarized as including the following:

Armatures, motors, and generators rewound.....	307
Transformers and miscellaneous coils rewound.....	131
Magnetos and fan motors rewound or repaired.....	156
Miscellaneous electrical appliances repaired.....	62
Switchboard and panels manufactured.....	148
Miscellaneous other repair jobs.....	180

The force of the electrical division handled 361 jobs of marine electric work at Cristobal and 416 jobs of the same class at Balboa; the more important items of this class of work include the complete rewiring or overhauling of and making additions to the electrical installations aboard the steamships *Cristobal*, *Acajulla*, *Ansaldo San Giorgio*, *Salaverry*, *Paita*, *Circassian Prince*, *Azov*, *Ardmore*, and the Peruvian cruiser *Lima*.

MUNICIPAL ENGINEERING DIVISION.

The details of the operations of the municipal engineering division during the fiscal year are covered in the report of the municipal engineer, which follows:

MUNICIPAL ENGINEERING DIVISION.

D. E. Wright, Municipal Engineer.

The municipal division performed the necessary surveys for new townsite projects, the layout and design for water, sewers, storm drainage, streets, sidewalks, and landscape work for same; the maintenance and operation of all roads, water-pumping stations, purification plants, pipe lines, and such building construction work as directly concerned this division. The principal items of new construction were the new Army post at Fort Clayton, located at Miraflores, and Fort Davis, located at Gatun; the extension of Colon, comprising the area between G and K Streets and between Seventh and Ninth Streets, an area giving 99 building lots for residential purposes for private individuals; also an area in this vicinity lying between G and K Streets and Second and Seventh Streets as a proposed addition for residential purposes for Canal employees. The development of the area between Fourteenth Street and Folks River for Panama Railroad stables, and the area between E and G Streets and Fourteenth and Fifteenth Streets for warehouse purposes; development for the area for construction of 33 houses for silver employees of the Panama Railroad on the docks and at the coal-handling plant—this involved grading, the installation of water and sewer lines, streets and sidewalks; the area developed was between Mount Hope and Colon, and designated as "Silver City"; construction of the concrete road with asphalt wearing surface for the lumber shed in Balboa to Diablo; the resurfacing and oiling of the Paraiso-Gamboa macadam road; the necessary street extension for new buildings at Fort Sherman, with the necessary water and sewer connections; the laying out and making the fill necessary for and grading the baseball park at Coco Solo; the laying of various stretches of concrete sidewalks and water connections for this point; the building of tennis courts at France Field, Gatun, and the resurfacing of tennis courts in Ancon; the construction of various sized storm sewers in the vicinity of Panama to relieve the combined sewer system originally

installed at this point, sewers ranging in size from $2\frac{1}{2}$ by $2\frac{1}{2}$ to 6 by 6; the demolition of the Caledonia bridge over the Panama Railroad tracks, and the putting in of a grade crossing.

ORGANIZATION.

The municipal division is divided into three sections, viz: The Southern district, including all points in the Canal Zone from Darien south and including the city of Panama; the Northern district, comprising all points in the Canal Zone from Darien north, including the city of Colon; and the operation of purification plants, testing laboratories, and reservoirs.

PERSONNEL.

Mr. R. C. Hardman transferred on October 15, 1919, as superintendent of the Southern district and was succeeded by Mr. George W. Green on October 16, 1919.

Mr. E. H. Chandler was relieved as superintendent of the Northern district on March 10, 1920, and was succeeded by Mr. A. C. Miller on March 11, 1920.

Mr. George C. Bunker, physiologist, continued in charge of the purification plants and laboratories.

Mr. A. G. Nolte was appointed assistant physiologist, effective February 21, 1920.

SOUTHERN DISTRICT.

In the Southern district all pumping stations, water and sewer lines, streets, sidewalks and roads, and the upkeep of equipment were performed, as well as various items of new construction pertaining directly to appropriations made this division, besides the performance of such construction work as was requested from other divisions of The Panama Canal, the United States Army, the United States Navy, private companies and individuals, and by the Panaman Government. The report of operations of pumping stations is given in the following statement:

Pumping station.	Total gallons pumped during year.	Average number gallons per month.	Average cost per thousand gallons for pumping.
Gamboa, U. S. No. 1.....	3,895,630,000	324,636,000	\$0.0154
Miraflores, U. S. No. 2.....	423,790,000	35,315,833	.0162
Balboa, U. S. No. 3.....	2,790,202,000	232,516,841	.0141
Paraiso.....	74,640,000	6,220,000	.0447
Cucaracha (Mount Zion).....	176,513,000	14,709,445	.....

In the city of Panama the usual maintenance work was performed by the municipal division on the water and sewer systems and pavements, the work of maintenance and operation in the city, including the installation of water meters on new construction, the repairs and maintenance of all work installed on previous construction, and the preparation and collection of water-rent bills for water consumed. The following table shows the quantity of water used in Panama during the fiscal year, by quarters, together with amount of water rentals:

Consumption per quarter.

Quarter ended—	Paying connections.	Private.	Public hydrant and taps.	Total.	Daily average consumption.
		<i>Gallons.</i>	<i>Gallons.</i>	<i>Gallons.</i>	<i>Gallons.</i>
Sept. 30, 1919.....	2,434	155,147,000	101,421,000	256,568,000	2,850,000
Dec. 31, 1919.....	2,433	149,873,000	101,862,000	251,735,000	2,797,000
Mar. 31, 1920.....	2,445	176,786,000	82,501,000	259,287,000	2,880,000
June 30, 1920.....	2,457	166,962,000	91,888,000	258,850,000	2,876,000
Total for year.....	.....	648,768,000	377,672,000	1,026,440,000	2,850,750

Collections.

Quarter ended—	Amount collected from private consumers. ¹	Average consumption per private connection per quarter.	Average private quarterly bill.
Sept. 30, 1919.....	\$40,698.60	Gallons. 63,741	\$16.72
Dec. 31, 1919.....	39,343.10	61,189	16.17
Mar. 31, 1920.....	46,256.80	72,305	18.92
June 30, 1920 ²	43,622.00	67,953	17.75
Total for year.....	169,920.50	265,188	69.56

¹ Includes all bills rendered against Panaman Government for water consumed in public buildings in Panama City.

² Net amount of bills due (not yet collected).

In addition to the regular maintenance and operation in Panama City, consisting in main of the following: Hydrants inspected and flushed, 2,544; repaired, 510; leaks repaired in service connection, 35; concrete pavement replaced or repaired, 173 square yards; brick pavement repaired, 341 square yards; meters repaired and reset, 597; meters set on new contracts, 16; stoppages cleared in sewer main, 47; manholes cleaned and flushed, 18,514; concrete pavements repaired and relaid, 5,828 square yards; concrete drains constructed, 488 linear feet; catch basins built, 5; sewer pipe for new connections laid, 231 linear feet; bricks reclaimed and cleaned, 7,450.

Under the appropriation of \$200,000 for sewer extensions and storm-sewer construction, the following work was performed: 350 feet 8-inch vitrified pipe laid between Northern Avenue and Eleventh Street; 260 linear feet of 2½ by 2½ concrete box sewer constructed on Northern Avenue to Thirteenth Street; 1,220 linear feet of 3½ by 3½ concrete box sewer from Thirteenth Street through Javillo fill to Northern Avenue; 100 linear feet of 4 by 5 concrete box sewer cross-connecting existing sewer on Northern Avenue; 880 linear feet of 4 by 4 concrete box sewer from Northern Avenue through Panama Railroad yard to Third of November and Nineteenth Streets; 750 linear feet of 5 by 5 concrete box sewer from Third of November Street down Ninth Street to Twelfth of October Street; 350 linear feet of 15-inch concrete pipe on Twelfth of October Street, from East Nineteenth Street to the beach; 1,330 linear feet of 3 by 3 concrete box sewer paralleling Third of November Street from East Nineteenth Street and crossing the Panama Railroad at Caledonia grade crossing, thence to the intersection of Central Avenue and L Street. The following amount of work was necessary for the above-mentioned construction work:

Excavation.....	cubic yards..	10,373
Backfill.....	do.....	8,890
Grading.....	square yards..	3,000
Concrete sidewalk rebuilt.....	do.....	292
Reinforcing steel placed—½-inch, ⅝-inch, and ¾-inch linear feet..		30,000
Concrete placed.....	cubic yards..	1,680

the above at a total cost of \$112,177.84.

The engineering forces performed the necessary work of preparing plans, estimates, and layout for the proposed new Santo Tomas Hospital on a special work request from the Panaman Government, besides performing various miscellaneous jobs in connection with the starting of this work by forces of the Panaman Government. A work request was also placed upon this division for the construction of the concrete streets in the hospital layout and on the 1st of July a total of 7,532 square yards of concrete pavement had been laid.

INDIVIDUALS AND COMPANIES.

The Central and South American Cable Company.—Work requests were issued by this company to the amount of \$5,615.32, covering water and sewer connections for their buildings, grading, and grass planting in the vicinity of same and the necessary patrolling of water and sewer lines supplying their reservation.

The Panama Electric Company.—The Panama Electric Company made deposits for work to be performed by the municipal forces, amounting to approximately \$5,500. This work consisted of surfacing in their track right of way on C Street, the construc-

tion of concrete landing platform, the furnishing of asphalt for various patching jobs on their right of way, and the concreting in of their tracks for the grade crossing at the site of the old Caledonia Bridge.

WORK PERFORMED FOR DEPARTMENTS, DIVISIONS, AND OTHERS.

Under other departments and divisions of The Panama Canal miscellaneous work was performed as follows:

For the electrical division, fortification division, police and fire division, division of surveys, and subsistence department only, a miscellaneous amount of work was performed on different work requests to the amount of \$1,512.

Building division.—A series of miscellaneous work was done amounting to approximately \$18,773, consisting, in the main, of concrete walk to seamen's home, Balboa; municipal work for three type-18 houses, Balboa; municipal work for Lodge Hall, Paraiso; municipal work for nine type-15 cottages, Pedro Miguel; construction of concrete floor in garage at Ancon; construction of floor for garage, near the National Institute, Ancon; construction of floor in two garages, Balboa district; construction of floor and approaches for garage at Pedro Miguel; municipal work for new National Catholic War Community Building, Balboa.

Supply department.—Miscellaneous work to the amount of \$10,738 was performed. The more important are as follows: Road construction to new garages; construction of roadway to Balboa store; paving in the vicinity of the new oil storehouse; the laying of 6-inch cast-iron water line for fire protection and operation of the fuel-oil handling plant, Balboa; construction of sidewalks and steps to various houses in the district; construction of clotheslines throughout the Ancon-Balboa district; installation of air tank for the La Boca mess.

Mechanical division.—Miscellaneous work to the amount of approximately \$2,726 was performed, the more important items being the construction of sidewalks in the shops' district, the installation of an industrial railway track from their sawmill to the boiler house, and the repaving of certain areas of the shops' roads.

Health department.—Miscellaneous work was performed for this department to the amount of approximately \$600, consisting of the paving of certain drainage ditches and filling in the vicinity of their old larvacide plant, Ancon.

Marine division.—Miscellaneous work to the amount of approximately \$877 was performed. The principal item was the construction of a garbage platform in the vicinity of the port captain's office, Balboa.

Panama Railroad.—For the Panama Railroad Company miscellaneous work was performed to the amount of approximately \$37,100, the principal item of construction being the demolishing of the Caledonia bridge in Panama City and the construction of a grade crossing over the Panama Railroad Company's tracks. This work to date is 95 per cent completed and consists of the following: 12,049 cubic yards excavated; 5,242 square yards subgraded; the placing of 3,528 square yards of concrete pavement in roadway and sidewalks; the placing of 5,289 square yards of sheet asphalt wearing surface, together with the necessary catch basins, drains, and retaining walls.

Another item of construction under this appropriation was the raising of the roadway to Pier No. 18. The remaining work consisted of 24 miscellaneous small jobs.

Bureau of clubs and playgrounds.—Miscellaneous work to the amount of approximately \$8,495 was performed, consisting mainly of the resurfacing of tennis courts in Ancon and Pedro Miguel, the regrading and surfacing of the Balboa baseball grounds, repairs to the running track, the placing of a sheet asphalt floor in the Balboa play shed, and the installation of water and sewer lines to the Balboa gun club.

Dredging division.—Miscellaneous work was performed for this division to the amount of \$2,678. This consisted principally of the laying of pipe lines of various sizes for supplying their relay pumps in the vicinity of Contractors Hill; 13 jobs were done on Panama Canal orders.

United States Army.—Plans and estimates were made up and submitted giving in detail all costs and showing the location of the Pacific side of the Canal covering the proposed scheme of the Army board for permanent Army posts in this locality. At Quarry Heights military headquarters roads, walks, sewer and water lines were laid. At Empire and Culebra, on the west side of the Canal, 35,000 linear feet of water-bound macadam road were repaired. At Corozal 1,235 linear feet of 15-inch concrete pipe were laid as a sewer line from the stables.

At the new Army post at Fort Clayton the following important items of construction were performed, the cost of this work, which is now 95 per cent completed, amounting to \$355,829.12:

Roads laid.....	square yards..	23, 779
Excavation.....	cubic yards..	17, 545
Grading.....	do.....	33, 030
Temporary railroad track laid.....	feet..	1, 882
Storm sewers laid.....	linear feet..	3, 240
Box culverts constructed—4 by 4.....	do.....	63
Vitrified and concrete pipe for sewer system laid—various sizes.....	do.....	6, 405
Cast-iron water pipe laid, various sizes, from 16" to 14" in diameter.....	do.....	9, 080
Lead pipe for services, together with necessary hydrants, valves, meters.....	do.....	1, 131
Sheet asphalt wearing surface laid.....	square yards..	13, 183
Concrete curb and gutter constructed, together with necessary catch basins and storm drains.....	linear feet..	17, 842
Sidewalks laid.....	square yards..	6, 961
Concrete eave gutters placed.....	linear feet..	3, 921

At the Cardenas River bridge a culvert was driven under the present railroad culvert to zero elevation as a sanitary measure. This culvert was 3½ by 3½ feet and 237 feet long. There were 1,070 cubic yards of excavation and fill made in connection with the sanitation in contiguous areas to the post. For the stables and wagon sheds there were 4,150 square yards of concrete floor laid and three concrete water troughs constructed. This job is 90 per cent completed.

In addition to the regular construction work outlined above for the Army, we were called on from time to time to prepare plans and estimates for various work which they desired done, and all water and sewer lines in the various posts were maintained. Among other items of construction outside of the new post, the following are the most important: Installation of water line for the new forage sheds constructed at Corozal, which necessitated the laying of 1,584 linear feet of 6-inch cast-iron water mains and the construction of the necessary fire hydrants and valves; construction of a concrete road to Quarry Heights to noncommissioned officers' quarters, consisting of the laying of 796 square yards of concrete; and the widening of the road at Quarry Heights, in which were placed 145 square yards of concrete with asphalt wearing surface.

In Corozal 5,769 square yards of sheet asphalt wearing surface were placed on the old macadam road at this point after same had been shaped up. There was also installed at the engineer depot at Corozal necessary fire protection for this point, which required the laying of 970 linear feet of 6-inch cast-iron pipe and the installation of three fire hydrants.

At Fort Amador 20,000 square yards of road were rolled and treated with oil and sand.

United States Navy.—The municipal division was called on from time to time to perform miscellaneous jobs for the United States Navy, this work consisting principally of water lines, repairs to their pumping equipment, and the various roads and sidewalks in their reservation.

The following table shows material received, expended, and on hand in the Southern district as of July 1, 1920:

Material.	On hand June 30, 1919.	Received 1919-20.	On hand and received.	Expended 1919-20.	Balance on hand June 30, 1920.
Cement.....barrels.....	304½	13,928	14,232½	13,393½	839
Sand.....cubic yards.....	523½	5,408	5,931½	5,498	433½
Rock.....do.....	1,794½		1,794½	660	1,134½
Gravel.....do.....	301½	8,629	8,930½	8,221½	708½
Gravel (storage).....do.....	6,739		6,739	560	6,179
Lumber.....board measure feet.....	32,126	115,950	148,076	147,426	650
Lumber (native).....do.....	2,653	8,554	11,207	11,207	
Reinforcement.....pounds.....	26,248	125,962	152,210	151,344	866
Pipe, vitrified, 6-inch.....feet.....	2,566	3,356	5,922	5,437	485
Pipe, vitrified, 8-inch.....do.....	4,532	1,818	6,400	4,824	1,576
Pipe, vitrified, 10-inch.....do.....	1,791	1,075	2,866	1,842	1,024
Pipe, vitrified, 12-inch.....do.....	1,089		1,089	1,038	51
Pipe, galvanized iron, 1-inch.....do.....	50	123	173	96	77
Pipe, galvanized iron, 1½-inch.....do.....	63	143	206	157	49
Pipe, galvanized iron, 2-inch.....do.....	124	358	482	446	36
Pipe, galvanized iron, 2½-inch.....do.....	878	1,525	2,403	1,958	445
Pipe, galvanized iron, 3-inch.....do.....	1,692	542	2,234	1,886	348
Pipe, galvanized iron, 3½-inch.....do.....	102	1,128	1,230	1,170	60
Pipe, galvanized iron, 4-inch.....do.....	562	126	688	327	361
Pipe, galvanized iron, 2-inch.....do.....	1,156		1,156	448	708
Pipe, galvanized iron, 2½-inch.....do.....	179		179	40	139

Material.	On hand June 30, 1919.	Received 1919-20.	On hand and received.	Expended 1919-20.	Balance on hand June 30, 1920.
Pipe, galvanized iron, 3-inch.....pounds..	41	.....	41	41	.....
Pipe, galvanized iron, 3½-inch.....do.....	42	.....	42	42	.....
Pipe, galvanized iron, 4-inch.....do.....	44	100	144	144	.....
Pipe, cast iron, 4-inch.....do.....	120	.....	120	120	.....
Pipe, cast iron, 6-inch.....do.....	666	1,596	2,256	2,196	60
Pipe, cast iron, 8-inch.....do.....	448	.....	448	448	.....
Pipe, cast iron, 10-inch.....do.....	.....	456	456	456	.....
Pipe, cast iron, 16-inch.....do.....	.....	4,128	4,128	3,324	804
Oil, fuel.....barrels.....	489.21	1,791.10	2,280.31	2,074.89	205.42
Meters, water, 1-inch.....each.....	152	.....	152	151	1
Meters, water, 1-inch.....do.....	65	.....	65	31	24
Meters, water, 2-inch.....do.....	.....	4	4	4	.....
Meters, water, 3-inch.....do.....	.....	1	1	1	.....
Pipe, concrete, 15-inch.....feet.....	2,778	6,791	9,069	7,251	1,818
Pipe, concrete, 20-inch.....do.....	720	.....	720	720	.....
Pipe, concrete, 24-inch.....do.....	30	.....	30	30	.....
Leadite.....pounds.....	58	.....	58	58	.....
Jute.....do.....	3,048	.....	3,048	1,316	1,732
Lead.....do.....	27,041	8,982	36,023	35,678	345
Hydrants.....each.....	23	50	73	51	22
Bricks.....do.....	92,100	.....	92,100	14,352	77,748
Meter parts.....lot.....	\$704.95	\$1,573.42	\$2,278.37	\$1,295.85	\$982.52
Valves, 4-inch.....each.....	5	15	20	15	5
Valves, 6-inch.....do.....	1	60	61	40	21
Valves, 8-inch.....do.....	6	5	11	6	5
Valves, 10-inch.....do.....	3	2	5	5	.....
Valves, 12-inch.....do.....	2	.....	2	2	.....
Valves, 16-inch.....do.....	.....	4	4	2	2
Muralite.....pounds.....	3,010	.....	3,010	.....	3,010
Asphalt.....do.....	335,800	579,160	914,960	\$90,545	24,415
Tarvia.....gallons.....	947	7,412	8,359	3,642	4,717
Binder.....do.....	.....	1,211½	1,211½	.....	1,211½

NORTHERN DISTRICT.

Under municipal work chargeable to allotments made for Canal construction work, the sum of \$127,461 was spent on the following projects: Construction of the water and sewer lines for ten 12-family silver quarters at Mount Hope; the construction of sidewalks in the vicinity of Cristobal coral; grading, rolling, and installation of sewer and water lines and construction of sidewalks in the Gatun district; the laying out, grading, installing of water, sanitary and storm sewer lines, grading for and construction of concrete streets and sidewalks for the New Cristobal townsite.

The laying out and putting in of necessary municipal work for the extension of the new townsite for Canal employees involved the following work:

Excavation for fill of 156,719 cubic yards.

Laying of 22,400 square yards of concrete for streets.

Installation of 17 catch basins.

Placing of 1,034 square yards of concrete in slabs for gutters.

Construction of 16,074 linear feet of curb and gutters.

Placing of 6,188 square yards of sidewalks.

Digging of 200 linear feet of ditch for drainage purposes.

9,200 square yards of finished grading.

Grading and rolling 37,204 square yards of the townsite.

Construction of 29 manholes and laying of 6,214 linear feet of vitrified pipe.

8,198 linear feet of cast-iron pipe for water lines laid, 12-inch, 10-inch, 8-inch, 6-inch, and 4-inch, in addition to necessary storm sewers laid for draining town-site areas.

Under the head of "Maintenance" the sum of \$208,647 was spent for the operation and upkeep of the pump stations, reservoirs, roads, streets, sidewalks, water and sewer lines; also as a charge against maintenance, an electric booster pump of 5,000 gallons a minute capacity and driven by a 250-horsepower motor was installed. There were 21,543 square yards of macadam road repaired and oiled, in addition to the upkeep of all roadside ditches and the making of such repairs that were necessary to concrete roads in this district.

The following is a statement of water pumped at each of the pump stations during the year, giving an average monthly pumping and the average rate per 1,000 gallons:

Pumping station.	Total gallons pumped during year.	Average number of gallons per month.	Average cost per thousand gallons for pumping.
Mount Hope.....	2,157,686,000	179,807,166	\$0.019
Agua Clara.....	427,714,000	35,642,000	.014
Frijoles.....	11,620,000	968,333	.1792
Monte Lirio.....	3,264,000	272,000	.5317

The following statement shows the division cost of water delivered in the various districts of the Canal Zone during the fiscal year ended June 30, 1920:

District.	Cost per thousand gallons.	District.	Cost per thousand gallons.
Cristobal.....	\$0.07	Pedro Miguel.....	\$0.07
Gatun.....	.14	Miraflores.....	.06
Gamboa.....	.08	Ancon-Balboa.....	.07
Paraiso.....	.07		

The sale of water to vessels at the docks was handled as in the past. Water was delivered to ships at the rate of 50 cents per 1,000 gallons, with a minimum charge of \$3, excepting Docks No. 2 and No. 3, where the minimum charge was 50 cents, this applying to small coastwise boats. A total of 2,215 vessels was furnished with 110,825,282 gallons of water, this being an average of 9,235,440 gallons per month.

The cost for the year of handling water amounted to \$11,527.81. In the city of Colon the sum of \$69,055 was spent on the maintenance and repairs of streets, water and sewer system, and the cost of water collections and plumbing inspection work.

The following statement shows the quantity of water used in Colon during the fiscal year, by quarters, together with the amount of water rental:

Quarter ended —	Paying connections.	Consumption per quarter.				Total consumption.	Average daily consumption.
		Private connections.	Panama Railroad reservation.	Panama Canal hospital and quarantine.	Public fire hydrants and taps.		
		Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Sept. 30, 1919.....	984	73,186,000	6,807,750	9,099,750	56,837,150	145,930,650	1,621,452
Dec. 31, 1919.....	987	77,739,750	8,087,006	8,451,000	67,316,675	161,594,325	1,795,492
Mar. 31, 1920.....	992	75,028,500	9,133,750	9,496,500	56,902,025	150,560,775	1,612,897
June 30, 1920.....	998	80,316,250	8,504,250	10,477,750	67,987,500	167,286,050	1,858,734
Total for year.....		306,270,500	32,532,750	37,525,000	249,013,550	625,371,800	1,737,144

Quarter ended —	Amount collected from private consumers.	Amount collected from Panama Railroad.	Amount collected from Panama Canal.	Total revenue per quarter.	Average consumption per private connection.	Average private quarterly bill.
					Gallons.	
Sept. 30, 1919.....	\$29,166.50	\$2,042.70	\$2,732.70	\$33,941.90	74,376	\$29.64
Dec. 31, 1919.....	28,953.20	2,426.10	2,536.50	33,915.80	78,463	29.33
Mar. 31, 1920.....	30,226.80	2,740.50	2,850.00	35,817.30	75,633	30.40
June 30, 1920.....	32,524.80	2,551.80	3,114.90	38,221.50	80,177	32.59
Total for year.....	120,871.30	9,761.10	11,264.10	141,896.50	77,310	30.49

NOTE.—For quarter ended June 30, 1920:

Net amount of private bills to be collected.....\$32,424.80

Approximate amount of discount to be collected.....100.00

Approximate amount to be collected from private consumers.....32,524.80

WORK PERFORMED FOR DEPARTMENTS, DIVISIONS, AND OTHERS.

For other departments and divisions of The Panama Canal, the United States Army and Navy, and outsiders, the work performed was as follows:

United States Army.—A sum of \$329,786 was spent on the post at Fort Davis, located at Gatun. The work at this post is approximately 85 per cent completed. The principal items of work under this expenditure consisted of the necessary design work for sewer and water systems, the laying out of the streets and sidewalks, and the location of the buildings on the post.

In preparing the site 166,204 cubic yards of earth were excavated and used for fill; 10,103 linear feet of temporary railroad track constructed; 9,448 linear feet of sewer line, varying from 24-inch to 6-inch, with the necessary manholes; 38,170 square yards of the area subgraded, graded, and rolled; 320 linear feet of concrete box culvert constructed; 16,922 linear feet of curb and gutter; 34,270 square yards of concrete road built; 9,912 linear feet of cast-iron water pipe for a distribution system laid, the pipe ranging in size from 12 inches to 6 inches; 6,782 linear feet of 15-inch, 20-inch, and 24-inch concrete pipe laid for storm sewers; 23,051 square yards of finished grading, and 1,030 square yards of grass planted, and 3,860 square yards of sidewalk laid.

Under the head of Miscellaneous Work for the United States Army, the sum of \$22,687 was spent, the principal items of work being as follows:

At Fort Sherman, 6,255 cubic yards of excavation, 4,087 cubic yards of backfill, 2,861 square yards placed in road slabs, and 492 square yards of sidewalk laid.

At France Field, 422 cubic yards of rock and coral were used in the construction of 1,596 square yards of temporary roads, 2,960 linear feet of 6-inch drain tile laid, 706 linear feet of concrete curb constructed, 12,250 square yards of grading done, 1,344 square yards of grass planted, 1,368 linear feet of 8-inch, 6-inch, and 4-inch cast-iron water pipe laid, 824 linear feet of galvanized iron pipe laid, 623 linear feet of vitrified pipe laid, and two double tennis courts with concrete foundation.

United States Navy.—For the United States Navy the sum of \$37,786 was spent. The principal items of construction were as follows:

Placing of eave gutters around the 100-man barracks, the performing of the necessary grading and installing of sanitary ditches around officers' quarters, and the construction of 576 linear feet of sea wall, the putting in of a baseball park at Coco Solo, the placing of concrete walks, the building of a coal bin, the laying out and filling with necessary grading of a ball field at the new aviation station. The above involved the following work: 1,644 cubic yards of excavation, 1,186 cubic yards of fill, 150 cubic yards of cinders used, 12 catch basins constructed, the placing of 182 cubic yards of concrete in the coal bin and sea wall, the placing of 3,022 square yards of concrete in street pavements and sidewalks, 3,800 linear feet of concreted gutter laid, 2,500 linear feet of open drains, 95,426 square yards of area graded, the laying of 1,609 linear feet of sewer pipe and 738 linear feet of water lines.

Building division.—Under various work requests from the building division the sum of \$47,010 was spent, the principal items of construction being as follows: The placing of a 20-inch raw water line from the Mount Hope power plant to the cold-storage plant; the laying of water and sewer lines to the new shop building, Cristobal docks; the placing of concrete slab under the new stable area in Colon; the putting in of necessary road to the new incinerator plant; the installing of a water system for Dock No. 3, Colon, the work as a whole involving the following items: 4,540 cubic yards of excavation, 2,860 cubic yards of backfill, the placing of 2,620 square yards of concrete in roadway, the laying of 8,005 square yards of concrete for stable area, the laying of 764 linear feet of water lines, 2,490 linear feet of 20-inch combination sewer and storm drain, and 819 linear feet of new laterals.

Supply department.—Under work requests received from the supply department the sum of \$8,681 was spent. The principal items of construction were: Laying of fuel-oil lines to Docks Nos. 13, 14, and 16; construction of loading platform at Mount Hope; laying of a 5-inch gasoline oil line from the manifold to the gasoline oil tank. The above work involved the following: 345 cubic yards of excavation and backfill, the laying of 3,135 linear feet of 5-inch galvanized pipe; the laying of 361 linear feet of 4-inch galvanized pipe, and the placing of 153 square yards of concrete.

Bureau of clubs and playgrounds.—Under work requests from this bureau the sum of \$9,799 was spent. The principal items of construction involved were: Laying out and putting in two double tennis courts at Gatun, the resurfacing of the tennis court at Cristobal, and the construction of a pipe fence around the Colon school grounds.

Land office.—On request of the land agent wells were dug at the new town of Chagres, located in the Republic of Panama. To date, a total of 1,640 feet has been drilled, water being found in only one location.

Miscellaneous.—Under the head of Miscellaneous Work performed for The Panama Canal (P. C. No. 431), the sum of \$9,417 was expended. This covered small jobs for various divisions and departments of The Panama Canal.

Work for outsiders.—For outsiders a sum of \$791 was expended, which included the making of water and sewer connections for private parties in the city of Colon, the construction of a new curb line for Slifers' Park, Colon, and the laying out and construction of an athletic track for the Fourth of July committee at Cristobal.

Panama Railroad Company.—On authorities issued by the Panama Railroad Company, the sum of \$348,424 was spent. The principal items of work under the authority were as follows:

Filling, grading, installation of water, sewer, and storm-sewer lines, concrete roads and sidewalks for the new silver townsite located between Mount Hope and New Cristobal, this area requiring a fill of 47,800 cubic yards; the development of block 54 as a warehouse site, which included fill, grading, water, sewer, storm sewers, streets, and railroad tracks; the development of the new residential area in Colon between Seventh and Ninth and G and K Streets, this requiring the townsite layout; the grades for fills, the installation of water, sewer, and storm-sewer lines; the laying of concrete streets and sidewalks; the construction of a concrete road from the new cold-storage plant to the Margarita-Mount Hope Road; the extension of the concrete roads to Pier No. 6; the laying out of and the putting in of the necessary water, sewer, streets, and concrete floors for the new stable area in Colon; the construction of a circulating water system from the Mount Hope filtration plant to the new cold-storage plant; the installation of water and sewer lines for the new railroad station located in the vicinity of the Army post at New Gatun, besides a miscellaneous number of small jobs at various localities.

The principal items of work involved were laying of 47,228 square yards of concrete sidewalks and streets; placing of 13,436 square yards of concrete in stable area; construction of 31,365 linear feet of concrete curb and gutter; laying of 1,104 linear feet of 20-inch and 24-inch concrete pipe; laying of 2,911 feet of 20-inch concrete pipe line for water circulation at the cold-storage plant; the rolling of 181,100 square yards for roads and building sites; the laying of 1,900 linear feet of permanent railroad track for warehouse area; the laying of 24,767 linear feet of 12-inch, 10-inch, 8-inch, 6-inch and 4-inch water lines; laying of 11,000 feet of 20-inch, 15-inch, 12-inch, 10-inch, and 6-inch sewer lines; the laying of 2,074 linear feet of 2½-inch, 2-inch, and 1-inch galvanized pipe line for water distribution in stable area and for a water supply at Manawa plantation.

The following is a list of the more important items of stock material used on construction and maintenance work in the Northern district during the fiscal year:

Cement.....	barrels..	41,605
Gravel.....	cubic yards..	33,418
Sand.....	do.....	5,085
Lumber.....	feet b. m..	269,609
Reinforcing.....	pounds..	172,280
Concrete pipe, 15-inch.....	linear feet..	2,739
Pipe, 20-inch.....	do.....	4,041
Pipe, 24-inch.....	do.....	3,400
Lead.....	pounds..	65,459
Vitrified sewer pipe, 6-inch, 8-inch, 10-inch, 12-inch, and 15-inch.....	linear feet..	49,249
Galvanized pipe, various sizes.....	do.....	24,797
Second-hand galvanized pipe in various sizes.....	do.....	5,839
Coal.....	pounds..	384,100
Concrete drain tile, 4-inch.....	feet..	1,600
Extra heavy pipe, 12-inch.....	do.....	100
Cast-iron valves, various sizes, 4 to 20 inches.....		329
Fire hydrants.....		70
Asphalt.....	pounds..	43,565
Tarvia.....	gallons..	1,321
Meter parts.....	dollars..	1,513.20
Miscellaneous cast-iron fittings.....	do.....	1,908.28
Crude oil.....	barrels..	307.53

OPERATION OF WATER-PURIFICATION PLANTS AND TESTING LABORATORIES.

The following is a report of work performed by the chemical section of the testing laboratories at Miraflores during the fiscal year ended June 30, 1920:

	Number of samples analyzed.
Asphalt and tarvia.....	3
Asphalt wearing surface.....	34
Miscellaneous work, including samples of paints, asphaltic enamels, oils, sand, lime, alum, coal, ores, alloys, electrolytes, soap polishes, water samples, etc..	271

The following is a summary of the report of work performed in connection with the operation of water-purification plants during the 11 months ended May 31, 1920:

	Agua Clara.	Mount Hope.	Miraflores.
Placed in service.....	Dec. 23, 1911.....	Feb. 23, 1914.....	Mar. 14, 1915.....
District supplied.....	Gatun, Toro Point.....	Colon, Mt. Hope, Margarita Point, Cristobal.	Pedro Miguel, Corozal, Ancon, Balboa, Panama, Paraiso.
Source of supply.....	Agua Clara Reservoir.	Braños Brook Reservoir.	Chagres River.
Rated capacity, gallons per day.....	2,500,000.....	8,000,000.....	15,000,000.
Method of purification.....	Aeration, sedimentation, rapid sand filtration.	Aeration, sedimentation, rapid sand filtration.	Aeration, sedimentation, rapid sand filtration.
Aeration basin:			
SI e.....feet.....	14 by 8.....	60 by 66.....	86 by 130.
Number of nozzles.....	.....	85.....	105.
Sedimentation basin:			
SI e.....feet.....	70.5 by 71.....	171 by 171.....	300 by 125.
Depth.....do.....	10.5.....	12.25.....	16.5.
Capacity.....gallons.....	350,000.....	2,500,000.....	4,500,000.
Period of sedimentation, (hours).....	10.....	14.....	12.
Rapid sand filters:			
Number of units.....	4.....	6.....	14.
Total sand area, square feet.....	1,156.....	3,078.....	5,950.
Depth of filtering material—			
Sand.....inches.....	30.....	30.....	30.
Gravel.....do.....	24.....	22.....	24.
Size of filtering material:			
Sand, effective SI e.....	0.44.....	0.41.....	0.41.
Sand, uniformity coefficient.....	1.81.....	1.70.....	1.70.
Gravel, SI e.....inches.....	$\frac{3}{8}$ to $1\frac{1}{2}$	$\frac{3}{8}$ to $1\frac{1}{2}$	$\frac{3}{8}$ to $1\frac{1}{2}$.
Percent of sand area covered by horizontal area of troughs.....	22.3.....	32.0.....	32.8.
Washing of filters:			
Vertical rise per minute, (inches).....	19.....	20.....	24.
Gallons per square foot of sand area.....	12.....	12.5.....	15.
Filter bottom, type.....	Harrisburg, Pa.....	Harrisburg, Pa.....	Concrete false bottom.
Loss of head:			
Average initial.....feet.....	0.5.....	1.3.....	1.0.
Average final.....feet.....	6.5.....	12.5.....	11.5.
Length of filter runs, hours, yearly average.....	66.8.....	33.3.....	37.4.
Volumes of water, average gallons per day:			
Raw.....	1,181,000.....	6,116,000.....	9,958,000.
Filtered.....	1,160,000.....	6,014,000.....	9,792,000.
Delivered to mains.....	1,139,000.....	5,884,000.....	9,512,000.
Wash water.....	21,000.....	130,000.....	219,000.
Per cent of wash water.....	1.77.....	2.15.....	2.55.
Chemicals, yearly averages:			
Alum, pounds per million gallons.....	370.....	128.....	160.
Lime, pounds per million gallons.....	80.....	.....	.....
Liquid chlorine, parts per million of available chlorine.....	0.323.....	0.356.....	0.374.
Physical and chemical characteristics of filtered water, parts per million:			
Color.....	4.....	0.....	0.
Turbidity.....	0.....	0.....	0.
Free carbonic acid (CO ₂).....	0.....	2.4.....	4.3.
Carbonate (CO ₃).....	0.7.....	0.....	0.
Alkalinity, erythrosine (CaCO ₃).....	18.4.....	38.0.....	49.5.
Hardness, soap (CaCO ₃).....	37.4.....	37.9.....	48.6.
Oxygen consumed.....	1.73.....	1.2.....	0.6.
Chlorine (Cl).....	7.2.....	5.2.....	6.7.
Iron (Fe).....	0.16.....	0.09.....	0.03.
Solids total.....	86.....	82.....	100.
Nitrogen, as—			
Nitrites (NO ₂).....	0.0005.....	0.0000.....	0.0002.
Nitrates (NO ₃).....	0.016.....	0.007.....	0.021.
Colonies of bacteria per c. c. in water from distribution in system:			
Nutrient agar at 37.5° C.....	88.....	16.....	15.4.
B. coli index, number per liter.....	1.4.....	0.5.....	7.9.

Concrete test specimens made and broken during the fiscal year ended June 30, 1920.

(Cylinders 6 inches in diameter and 12 inches high.)

	Runs sampled.	Cylinders.		Age of concrete in days.					
		Made.	Broken.	7	28	90	120	180	691
Pacific roads.....	47	636	508	64	192	144	104	4	.....
Pacific sidewalks.....	8	128	80	32	28	20	.....	.....	.....
Atlantic roads.....	28	416	348	84	108	96	60	.....	.....
Miraflores Dump 1.....	160	2,356	1,596	436	572	352	216	20	.....
New Gatun 1.....	69	980	580	176	232	100	72	.....	.....
Corral, Army post 2.....	3	48	36	12	12	8	.....	.....	.....
Concrete sewer pipe 2.....	2	24	24	.....	8	.....	8	.....	.....
Larvacide factory 2.....	0	0	3	.....	.....	.....	.....	.....	.....
Total.....	317	4,588	3,175	804	1,152	732	460	24	3

¹ Building construction, Army post.

² At Miraflores Army Post.

³ These cylinders were immersed in the carbolic-acid tank on Dec. 22, 1918, and were removed after a period of 457 days.

The following table shows the status of capital cost for municipal improvements in Panama and Colon:

Items.	Panama.	Colon.
Cost of original water and sewer system within city prior to July 1, 1910.....	\$504,911.57	\$314,760.99
Cost of original pavements within city prior to July 1, 1910.....	447,966.60	221,070.29
Cost of extensions to water and sewer systems within city prior to July 1, 1910.....	122,165.92	169,581.52
Cost of extensions to pavements prior to July 1, 1910.....	92,193.08	88,967.20
Interest on capital cost water and sewer systems and pavements prior to July 1, 1910.....	77,742.27	43,314.47
Proportion interest on capital cost reservoirs, pumping stations, and pipe lines prior to July 1, 1910.....	6,216.66	6,125.16
Cost of maintenance water and sewer systems and pavements, and proportion cost of maintenance reservoirs, pumping stations and pipe lines prior to July 1, 1910.....	99,617.17	145,025.27
Water rental collections prior to July 1, 1910.....	212,375.20	200,410.74
Capital Cost Water and sewer systems and pavements, July 1, 1920 ¹	1,106,926.48	980,222.25
Capital cost reservoirs, pipe lines, pump stations and filter plants in Zone July 1, 1920 ¹	1,765,222.58	585,642.89

¹ Panama Government pays a proportion of interest on these sums at 2 per cent based on relation of total quantity of water used in Panama and Colon to total quantity produced by system.

PANAMA.

Fiscal year ending—	New construction in city.	Maintenance work.	Interest.	Applied in amortization of capital cost.	Water rentals, including deficiencies.
June 30, 1911.....	\$54,609.74	\$30,121.03	\$25,759.26	\$26,611.99	\$78,467.71
June 30, 1912.....	38,745.05	35,553.86	26,532.29	31,651.54	97,772.26
June 30, 1913 ¹	1,815.77	38,470.70	27,468.14	48,937.71	114,876.55
June 30, 1914.....	1,505.37	104,469.25	23,086.29	32,648.88	166,204.42
June 30, 1915.....	5,034.13	88,414.68	24,505.45	25,247.78	138,167.91
June 30, 1916.....	.....	84,543.88	32,064.21	25,283.10	141,921.19
June 30, 1917.....	.....	97,744.09	30,404.15	25,283.07	153,431.31
June 30, 1918.....	.....	94,966.25	29,632.23	25,283.04	149,881.52
June 30, 1919.....	53,960.58	110,749.46	29,166.31	25,459.76	165,375.53
June 30, 1920.....	104,932.64	126,423.17	31,574.51	28,076.47	186,074.15
Total.....	262,971.74	811,466.37	286,222.84	294,483.34	1,392,172.55

COLON.

June 30, 1911.....	\$188,114.24	\$43,111.09	\$19,041.25	\$18,019.80	\$78,870.28
June 30, 1912.....	84,528.41	54,470.85	21,774.37	20,994.40	98,541.48
June 30, 1913.....	88,071.07	51,161.60	24,101.66	23,553.23	98,816.49
June 30, 1914.....	14,302.97	61,542.71	26,292.38	24,388.65	112,223.74
June 30, 1915.....	1,413.33	64,125.55	26,611.47	24,513.22	115,250.24
June 30, 1916.....	1,908.82	85,171.60	26,255.02	24,559.28	135,996.90
June 30, 1917.....	54,876.54	69,774.81	25,062.22	24,868.25	119,705.28
June 30, 1918.....	4,799.90	75,490.70	25,463.52	15,992.66	126,946.88
June 30, 1919.....	3,787.14	71,887.25	24,262.22	26,137.31	122,286.78
June 30, 1920.....	2,388.59	76,386.15	23,179.99	26,177.14	125,723.28
Total.....	444,191.01	653,122.31	242,045.10	229,213.94	1,134,361.35

¹ Indicates credit by adjustment.

SECTION OF METEOROLOGY AND HYDROGRAPHY.

The section of meteorology and hydrography continued to keep the permanent records of weather conditions on the Canal Zone, the hydrology of Gatun Lake watershed, and the hydrographic conditions at the Atlantic and Pacific ports of the Canal. Special investigations were carried to conclusion and report as indicated in the report of the chief hydrographer, which follows:

SECTION OF METEOROLOGY AND HYDROGRAPHY.

R. Z. Kirkpatrick, Chief Hydrographer.

Report on meteorological and hydrographic work and conditions for the calendar year 1919 and the months of January to June inclusive, 1920, is submitted herewith.

The section of meteorology and hydrography continued to keep the permanent records of weather conditions on the Canal Zone, the hydrologies of the Gatun and Miraflores Lakes watershed and the Chagres River, and the hydrographic conditions at the terminals of the Canal. Special investigations and reports were concluded and reported on as outlined in the report of the chief hydrographer.

PERSONNEL.

Mr. G. E. Matthew returned from military service and was reinstated as meteorologist August 14, 1919.

Mr. G. J. Bentley, meteorologist, resigned, effective September 18, 1919.

Mr. A. L. Amole, temporary clerk, was temporarily employed from June 1, 1920, to July 6, 1920.

Mr. S. Gottlich, observer, was employed on June 24, 1920, to fill a new position of observer at Cristobal.

Mr. R. L. Mitchell, hydrographer, resigned, effective June 29, 1920.

METEOROLOGY.

General.—But slight changes were made during the year in the meteorological stations. All stations mentioned in the 1919 annual report were continued in operation and the following new ones were established:

A standard rain gage was installed at La Palma, at the mouth of the Tuira River, Province of Panama, December, 1919. It is operated by the naval radio station at that point.

Standard rain-gage stations were also installed at Divala, Province of Chiriqui; Mariato, Province of Veraguas; and Mandinga Bay, Province of Colon, during the dry season of 1920. It is believed that these new rainfall stations will be of value in studying general isthmian storms. All these are cooperative stations and the section of meteorology and hydrography is at the expense of furnishing the rain gage only.

Precipitation.—Rainfall for the calendar year 1919 was *below* normal at all stations in the Canal Zone and vicinity, except Cape Mala, Taboga, Chilibrillo, and Bocas del Toro. The deficiencies ranged from 4.19 inches at Juan Mina to 32.14 inches at Brazos Brook. The rainfall was unequally distributed throughout the year, being unusually heavy in April, moderately heavy in October, and generally seasonally deficient during the remaining months of the year. At most stations October was the month of heaviest and March the month of lightest rainfall.

Annual totals ranged from 57.59 inches at Balboa to 147.45 inches at Porto Bello. The average rainfall in the Pacific section was 63.39 inches; in the Central section 79.11 inches, and in the Atlantic section 109.89 inches. The greatest amount of precipitation recorded on any one day was 9.09 inches at Porto Bello on April 23, 1919. Daily quantities of 4 inches or more were recorded as follows:

Station.	Date.	Rainfall.	Station.	Date.	Rainfall.
		<i>Inches.</i>			<i>Inches.</i>
Porto Bello.....	Apr. 19.....	5.44	Monte Lirio.....	Sept. 8-9.....	4.01
Gatun.....	Apr. 19.....	4.21	Colon.....	Oct. 8-9.....	4.43
Porto Bello.....	Apr. 23.....	9.09	Juan Mina.....	Oct. 10.....	4.04
Do.....	Apr. 24.....	5.12	Alhajuela.....	Oct. 22-23.....	4.06
Taboga.....	Aug. 7.....	4.16	Bocas del Toro.....	Dec. 10.....	4.64
Porto Bello.....	Aug. 14.....	4.78			

The four months' dry season rainfall for 1920 is the *lowest* on record since American occupation, in 1904, being slightly lower than the previous driest dry season of 1912. Dry season conditions continued until about the middle of May, whereas they usually end in mid-April. The rainfall for the first six months of 1920 has been below normal throughout the Zone and vicinity, the deficiency being most pronounced in the Atlantic section.

The monthly rainfall for 1919 and the first half of 1920 and the station averages are presented in Table No. 1. The maximum rainfall of record for periods of five minutes, one hour, and twenty-four hours are shown in Table No. 2. The monthly distribution of rainfall in 1919 at selected stations, compared with monthly normals, is shown graphically on Plate No. 12, and the distribution of annual rainfall in the Canal Zone is shown on Plate No. 13.

Air temperature.—The average air temperature for the year was slightly above the normal. The highest temperatures of the year occurred in general in February and April, and the lowest in March.

The means and extremes in air temperature for the calendar year 1919 are presented in the following table:

Station.	Maximum.		Minimum.		Annual mean.
	° F.	Date.	° F.	Date.	° F.
Balboa Heights.....	94	Feb. 6	67	Mar. 20	80.4
Gamboa.....	94	Apr. 11	66	Mar. 21	80.0
Alhajuela.....	93	Feb. 14	61	Mar. 22	78.9
Gatun.....	92	Apr. 26	70	Mar. 19	80.4
Colon.....	92	June 2	71	Dec. 13	83.3

¹ And other dates.

The maximum and minimum temperatures of record at the various stations are given below (records revised to June 30, 1920):

Station.	Maximum.		Minimum.		Annual average.	Years of record.
	° F.	Date.	° F.	Date.		
Balboa Heights.....	97	Apr. 7, 1912	63	Jan. 27, 1910	80.2	14
Gamboa.....	96	Apr. 11, 1920	63	Feb. 5, 1917	79.3	3
Alhajuela.....	98	Apr. 13, 1920	60	Mar. 7, 1920	78.9	9
Gatun.....	93	Apr. 18, 1920	66	Aug. 7, 1912	80.4	9
Colon.....	93	Apr. 12, 1920	66	Dec. 3, 1909	79.8	12

¹ And other dates.

NOTE.—The lowest temperature of record on the Isthmus since American occupation in 1904 is 59° F., recorded at Bas Obispo (near Gamboa) on February 9, 1937. The minimum temperature of record at Alhajuela should read 60° F., instead of 58° F. recorded in the 1913 annual report.

The highest temperature of record on the Isthmus, 98° F., was recorded at Alhajuela on April 13, 1920.

The air temperature during the first six months of 1920 has been above normal throughout the Zone.

Monthly temperature records and other meteorological data at the two principal stations are presented in Tables Nos. 3 and 4.

Winds.—The annual wind movement in the Canal Zone for the calendar year 1919 was generally above normal. March was the month of greatest wind movement, while the least wind movement occurred generally in June and September. Northwest, north, and northeast winds prevailed at all stations, although there was a considerable percentage of southerly and variable winds during the rainy season months.

The average hourly wind movement, prevailing direction, and maximum velocities at the various stations for the calendar year 1919 are presented in the following table:

Calendar year 1919.

Station.	Average wind movement (miles per hour).		Prevailing direction.	Maximum velocity.		
	1919	Annual average.		Miles.	Direction.	Date.
Sosa Hill.....	12.7	.....	Northwest	48	East.....	Aug. 5
Palboa Heights.....	8.1	7.5	do.....	36	Northwest	Mar. 7
Pedro Miguel.....	5.7	5.6	do.....	29	West.....	Aug. 15
Gamboa.....	5.5	5.0	Northeast	50	Northeast	Sep. 26
Gatun.....	6.2	7.1	Northwest	50	South.....	June 17
Colon.....	10.7	10.4	North.....	33	North.....	Nov. 28

The following table, revised to June 30, 1920, gives the maximum wind velocities of record at stations in the Canal Zone.

Station.	Maximum velocity.			Years of record.
	Miles.	Direction.	Date.	
Sosa Hill.....	48	East.....	Aug. 5, 1919	3
Palboa Heights.....	59	South.....	July 10, 1909	12
Pedro Miguel.....	30	Northeast	Sep. 23, 1912	10
Gamboa.....	30	do.....	Sep. 26, 1919	6
Gatun.....	50	South.....	June 17, 1919	9
Colon.....	46	North.....	Apr. 4, 1915	12

148 miles from the south was also recorded on Sosa Hill on June 11, 1913.

The wind movement during the first six months of 1920 was generally above normal, Sosa Hill being the only station having a slight deficiency. This station, however, has been in operation but three years.

Atmospheric pressure.—The mean atmospheric pressure for the calendar year 1919 was slightly below normal on both coasts. March was the month of highest pressure and June the month of lowest average pressure.

Relative humidity.—The mean relative humidity of the atmosphere for the calendar year 1919 was about 83 per cent on both coasts. March and October were the months of lowest and highest humidity, respectively, on the Pacific coast; on the Atlantic coast July was the month of highest average humidity and December the month of lowest average humidity.

Cloudiness.—The average daytime cloudiness for the calendar year 1919 was above normal on the Atlantic coast and below normal on the Pacific. January, March, and December were the months of least cloudiness, while the greatest cloudiness occurred in June and July.

Evaporation.—The evaporation for the calendar year 1919 was the highest on record on both coasts, but over the lake surface at Gatun it was slightly below the eight-year average.

During the first six months of 1920 the evaporation was generally above normal, due to unusual length and dryness of the dry season.

Fogs.—One light and one dense fog occurred at the Pacific entrance, and three light fogs occurred at the Atlantic entrance during the year 1919. The usual conditions of frequent night and early morning foginess prevailed at interior stations during the rainy season. Practically all fogs observed lifted or were dissipated by 8.30 a. m.

Sea, Chagres River, and Gatun Lake water temperatures.—The surface temperature of the sea was slightly above normal on both coasts. Records for the calendar year 1919 are given in the table following.

Temperature of the sea, Gatun Lake, and Chagres River, 1919.

Station.	Maximum.		Minimum.		1919 mean.	Annual aver- age.
	° F.	Date.	° F.	Date.		
Balboa (Panama Bay).....	87	Several dates..	68	Mar. 12.....	80.4	79.9
Colon (Caribbean Sea).....	87	June 2.....	79	Several dates..	82.4	82.2
Gatun (Gatun Lake).....	88	Several dates..	78	Nov. 8.....	83.0	.....
Gatun (Gatun Lake).....	91	May 21.....	80	Several dates..	83.6	.....
Alhajuela (Chagres River).....	87	Apr. 3.....	74	Sept. 30.....	79.1	.....

¹ From daily readings at 8 a. m. and 2 p. m. Bihourly readings at other stations.

Seismology.—Thirty-three seismic disturbances were recorded at the Balboa Heights seismological station during the fiscal year 1920. Most of these disturbances were slight tremors originating within 500 miles of the Canal Zone, and several shocks were less than 100 miles distant. Those shocks with epicenters less than 100 miles distant, though light, were sometimes felt by a number of people in the Canal Zone. Only a few tremors gave evidence of far distant origin. All seismic disturbances recorded during the year were too light to cause damage to Canal structures.

The number of seismic disturbances recorded by months during the past fiscal year are shown in the following table:

1919		1920	
Month.	Number of shocks. ¹	Month.	Number of shocks. ¹
July.....	4	January.....	4
August.....	1	February.....	6
September.....	1	March.....	6
October.....	2	April.....	2
November.....	3	May.....	3
December.....	1	June.....	.....

¹ Total, 33.

SPECIAL INVESTIGATIONS.

Special reports summarizing meteorological conditions in the Canal Zone, based on a study of the records, were made to you as follows:

1. Weather predictions from local barometer readings.
2. Soil temperatures in the Canal Zone.
3. Earthquakes in Panama up to January 1, 1920.
4. Evaporation in the Canal Zone.
5. Humidity and hot weather.
6. Panama rainfall.
7. Panama thunderstorms.
8. Sunshine and cloudiness in the Canal Zone.

Several of these reports were published in the Monthly Weather Review, United States Weather Bureau, and The Panama Canal Record.

PILOT BALLOON FLIGHTS.

Beginning June 1, 1920, this office has been making an 8 a. m. single theodolite balloon flight daily, except Sunday or holidays, or days of poor visibility, in cooperation with the Navy aviation field at Coco Solo, in a study of upper air currents. Balloons are observed in azimuth and altitude angle at one minute, or approximate 200-meter intervals, with special theodolite.

The following plates and tables accompany this report:

Plate No. 12. Monthly rainfall, 1919, and station averages.

Plate No. 13. Distribution of rainfall in the Canal Zone, maximum, minimum, current and average years.

Table No. 1. Monthly rainfall in the Canal Zone and vicinity, and station averages.

Table No. 2. Maximum rainfall in the Canal Zone and vicinity.

Table No. 3. Monthly meteorological data, Balboa Heights, Canal Zone, year 1919.

Table No. 4. Monthly meteorological data, Colon, year 1919.

Table No. 5. Monthly evaporation in the Canal Zone.

TABLE NO. 1.—*Monthly rainfall in the Canal Zone and vicinity, 1919, 1920, and station averages,*
[Values in inches.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
Balboa:													
1919.....	0.13	0.06	T.	6.32	5.92	7.75	4.94	5.96	8.46	11.82	5.10	1.13	57.59
1920.....	T.	T.	.35	3.54	2.24	4.42							
Average, 21 years.....	1.02	.60	.63	3.92	8.08	7.32	7.53	7.54	7.04	9.44	9.11	5.30	67.93
Balboa Heights:													
1919.....	.28	T.	T.	6.43	5.21	8.93	4.75	5.82	10.84	12.11	4.97	1.81	61.15
1920.....	T.	T.	.09	3.02	3.31	4.83							
Average, 22 years.....	1.00	.80	.65	3.09	8.46	7.56	7.69	7.72	7.89	10.33	10.10	4.17	69.46
Miraflores:													
1919.....	.16	.00	.00	5.79	6.07	4.60	8.03	4.02	8.33	11.54	5.17	4.11	58.12
1920.....	.03	.00	.02	3.60	4.38	9.87							
Average, 11 years.....	1.73	1.01	.41	1.32	9.63	8.28	8.14	8.16	9.14	12.00	10.12	6.36	79.60
Pedro Miguel:													
1919.....	.18	T.	T.	6.58	7.37	3.99	7.30	7.61	9.38	11.25	6.02	3.22	63.20
1920.....	.03	.07	.04	5.03	7.45	10.02							
Average, 12 years.....	1.16	.67	.32	4.43	10.59	8.99	8.74	8.26	8.87	11.79	10.82	5.42	80.06
Rio Grande:													
1919.....	.61	.02	.00	6.44	6.35	6.23	7.42	9.95	10.89	16.37	6.66	5.90	76.87
1920.....	.03	.05	1.30	1.30	7.38	11.78							
Average, 15 years.....	1.15	.68	.27	3.66	10.33	8.96	9.81	9.44	10.40	12.74	11.27	5.35	84.26
Culebra:													
1919.....	.62	.05	T.	7.41	6.90	5.73	7.52	8.58	11.73	15.62	7.40	3.42	74.98
1920.....	.05	.10	.81	1.20	6.78	12.08							
Average, 29 years.....	1.56	.65	.56	3.82	10.99	8.73	9.37	10.00	10.77	11.56	12.26	6.78	87.05
Camacho:													
1919.....	1.03	.21	.08	8.52	5.08	6.77	8.89	8.63	12.21	13.66	6.00	3.67	74.75
1920.....	.22	.05	.57	1.81	9.27	11.83							
Average, 13 years.....	1.03	.84	.40	3.80	11.07	9.54	9.66	9.43	10.45	13.23	12.87	5.46	87.78
Empire:													
1919.....	.50	.24	.05	7.52	7.01	5.57	7.72	8.49	11.01	12.41	6.65	2.43	69.63
1920.....	.15	.05	.80	1.51	7.66	11.01							
Average, 15 years.....	.78	.73	.33	3.71	9.92	8.50	8.89	9.12	8.92	13.22	11.53	4.81	80.46
Gambou:													
1919.....	.55	.21	.03	7.02	5.82	6.02	6.70	7.37	9.39	11.72	3.50	3.69	62.02
1920.....	.05	.10	.21	1.48	7.59	7.48							
Average, 37 years.....	1.73	.85	.72	3.69	10.70	9.68	10.12	11.77	10.38	12.76	11.87	6.54	90.81
Juan Mina:													
1919.....	.97	.01	.04	13.62	7.77	5.50	11.14	9.32	13.85	14.57	7.59	4.39	88.80
1920.....	.16	.12	1.00	1.46	3.98	5.78							
Average, 9 years.....	.72	1.19	.22	4.50	10.57	10.50	9.66	11.63	12.07	14.81	12.42	4.70	92.99
Alhainela:													
1919.....	.75	.04	.07	9.06	6.11	6.87	13.46	8.11	9.35	15.46	9.79	2.44	81.51
1920.....	.52	.15	.20	.83	4.46	11.16							
Average, 20 years.....	1.02	.74	.47	3.80	11.92	12.23	12.49	12.30	11.58	14.08	14.13	5.77	100.53
Vigia:													
1919.....	.93	.00	.01	10.02	4.30	7.07	13.92	7.82	11.96	12.01	5.99	1.82	75.85
1920.....	.24	.13	.22	.64	6.07	10.23							
Average, 11 years.....	.82	1.51	.39	3.82	11.31	12.91	12.35	12.23	13.03	15.86	14.15	4.34	102.72
Frijoles:													
1919.....	1.61	.52	.47	10.07	8.28	5.85	10.50	10.19	13.50	18.92	9.50	5.92	95.33
1920.....	.31	.25	.05	.06	4.02	10.20							
Average, 18 years.....	1.89	2.18	.57	5.15	11.47	9.69	9.92	10.26	11.34	16.28	15.74	5.66	100.15
Trinidad:													
1919.....	2.47	.34	.38	6.34	7.28	12.30	5.67	6.78	8.44	15.85	7.56	5.64	79.05
1920.....	.60	.40	.94	1.13	9.31	10.63							
Average, 12 years.....	2.76	2.51	1.90	5.10	13.03	10.32	8.94	10.20	11.00	14.60	17.03	7.78	105.17
Monte Lirio:													
1919.....	4.03	1.15	.59	11.66	5.20	8.16	9.37	10.17	15.48	15.84	9.09	7.73	98.47
1920.....	.37	.71	.78	.08	6.34	7.86							
Average, 12 years.....	2.86	3.12	2.22	5.75	12.50	12.30	11.62	11.73	13.04	16.72	20.49	8.78	121.13
Gatun:													
1919.....	1.42	.54	.59	12.04	7.16	12.54	7.86	9.07	8.42	17.46	7.19	6.62	90.91
1920.....	.71	1.00	.71	.14	2.65	7.38							
Average, 15 years.....	3.09	2.68	2.07	6.01	13.92	12.62	11.68	13.99	10.05	16.56	19.64	10.09	122.40
Brazos Brook:													
1919.....	2.48	.70	.73	12.48	8.71	11.70	9.28	11.10	10.55	20.65	5.22	6.79	100.39
1920.....	.30	.56	.90	.35	4.99	7.96							
Average, 13 years.....	3.13	3.05	2.10	5.61	13.32	14.40	15.02	14.45	12.24	17.24	21.17	10.80	132.53
Colon:													
1919.....	1.82	.36	.61	10.95	6.95	12.08	13.60	6.77	11.71	21.94	6.63	7.37	100.82
1920.....	.51	.54	1.08	1.72	5.48	13.29							
Average, 49 years.....	3.81	1.65	1.59	4.35	12.60	13.35	15.97	14.83	12.65	15.03	21.04	11.61	128.48
Porto Bello:													
1919.....	4.31	1.58	1.18	30.21	13.86	0.04	24.23	17.76	14.37	15.71	7.74	6.46	147.45
1920.....	2.52	1.61	1.07	2.67	5.05	0.17							
Average, 8 years.....	6.47	3.57	2.14	8.50	17.06	5.23	18.84	19.08	13.43	12.98	27.35	18.86	163.51

NOTE.—Station averages do not include 1920 records.

TABLE NO. 2.—*Maximum rainfall in the Canal Zone and vicinity, Oct. 1, 1905, to June 30, 1920.*

Stations.	Maximum rainfall, inches.					
	5 minutes.		1 hour.		24 hours. ¹	
	Inches.	Date.	Inches.	Date.	Inches.	Date.
Balboa (June 10, 1906).....	0.90	May 12, 1912	5.86	June 2, 1906	7.57	Nov. 16-17, 1906
Balboa Heights (Oct. 1, 1905) ².....	.64	Aug. 7, 1908	3.98	Oct. 9, 1911	7.23	May 12-13, 1912
Miraflores (June 19, 1914).....	.50	Sept. 6, 1917	4.09	Sept. 6, 1917	4.75	Sept. 6, 1917
Pedro Miguel (Jan. 1, 1908).....	.60	Nov. 11, 1908	3.46	.....do.....	5.45	Nov. 19-20, 1917
Rio Grande (Dec. 29, 1905).....	.75	July 24, 1908	4.14	Nov. 20, 1917	8.24	Do.
Empire (July 18, 1906).....	.60	July 25, 1906	4.19	Oct. 21, 1918	6.15	Dec. 3, 1906 ³
Gamboa (Nov. 18, 1905).....	.59	Oct. 21, 1918	3.32	May 11, 1911	6.56	Dec. 2-3, 1906
Alhajuela (Mar. 31, 1907).....	.60	July 27, 1908	4.19	July 8, 1915	8.19	Dec. 2-3, 1906 ³
Gatun (Oct. 1, 1905).....	.62	July 20, 1909	4.72	Aug. 12, 1914	10.48	Do.
Bohio (Oct. 1, 1905) ⁴.....	.67	Aug. 3, 1912	4.51	Aug. 7, 1908	8.85	Aug. 7-8, 1908
Colon (Oct. 1, 1905).....	.64	June 16, 1909	4.90	Oct. 8, 1909	8.53	Dec. 2-3, 1906
Porto Bello (May 1, 1908) ⁵	⁶ 2.45	Aug. 25, 1909	4.53	Nov. 29, 1911	10.86	Dec. 28-29, 1909
		Nov. 29, 1911				

¹ Maximum fall in 24 consecutive hours.² Formerly Ancon. Station moved to Balboa Heights Oct. 1, 1914.³ No automatic record on this date. Total for 24 hours ending at noon.⁴ Station closed January, 1912.⁵ Station closed Aug. 31, 1914, and reopened in December, 1918.⁶ Approximate. Automatic record indistinct, due to unusually excessive rate of fall.

NOTE.—Dates in parenthesis opposite station names refer to installation of automatic register.

TABLE NO. 3.—*Monthly meteorological data, year 1919, Balboa Heights, Canal Zone.*

	Atmospheric pressure (inches).		Air temperature (°F.).								Mean relative humidity (byhourly).	
	Station. ¹	Sea level.	Monthly mean.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Maximum daily Range.		Mean wet thermometer.
January.....	29,720	29,841	79.8	90	2	87.6	70	6	72.1	19	72.2	77.8
February....	29,748	29,870	81.4	94	6	89.4	70	14	73.5	20	72.8	74.4
March.....	29,751	29,872	80.8	92	16	88.9	67	20	72.8	23	72.0	72.9
April.....	29,708	29,828	81.6	93	3	88.4	72	6	74.9	18	75.1	80.1
May.....	29,699	29,820	81.2	92	4	86.8	73	1	75.6	17	76.8	86.0
June.....	29,690	29,812	80.6	90	3	86.3	72	18	74.9	16	76.0	86.2
July.....	29,714	29,834	80.6	91	14	86.8	71	8	74.4	17	75.5	85.6
August.....	29,730	29,851	81.4	92	4	87.9	72	20	74.9	18	75.6	85.1
September....	29,712	29,834	79.4	90	6	85.1	71	27	73.6	18	74.8	86.9
October.....	29,708	29,830	79.7	90	21	85.8	70	6	73.6	18	74.7	87.1
November....	29,724	29,846	79.1	90	12	86.0	70	14	72.2	18	73.8	84.5
December....	29,734	29,856	79.8	92	8	87.5	68	13	72.1	19	73.0	80.8
Year...	29,720	29,841	80.4	94	26	87.2	67	20	73.7	23	74.4	82.3

¹ Elevation of barometer 118 feet above mean sea level.² February.³ March.

TABLE NO. 3.—*Monthly meteorological data, year 1919, Balboa Heights, Canal Zone—Continued.*

	Precipitation (inches).			Wind.				Number of days.					
	Monthly total.	Normal. ¹	Rainy days.	Prevailing direc- tion.	Total movement (miles).	Miles per hour.	Direction.	Date.	Clear.	Part cloudy.	Cloudy.	Thunderstorms.	Average cloudi- ness. ²
January.....	0.28	1.00	7	N.	8,573	32	NW.	10	8	22	1	0	4.5
February.....	T.	.80	0	N.	7,867	32	N.	19	5	23	0	0	4.8
March.....	T.	.65	0	N.	10,196	36	NW.	7	16	15	0	0	4.1
April.....	6.43	3.09	15	NW.	6,537	31	NW.	26	0	18	12	8	7.2
May.....	5.21	8.46	23	NW.	4,807	30	S.	15	0	20	11	9	7.2
June.....	8.93	7.56	19	NW.	4,521	28	SW.	16	0	12	18	15	7.7
July.....	4.75	7.69	15	NW.	5,150	25	S.	28	0	16	15	15	7.4
August.....	5.82	7.72	22	NW.	4,884	32	SW.	5	0	21	10	15	7.0
September.....	10.84	7.89	21	NW.	4,090	22	S.	13	0	14	16	15	7.5
October.....	12.11	10.33	22	NW.	4,516	31	S.	24	1	11	19	16	7.6
November.....	4.97	10.10	17	N.	4,327	32	NE.	21	1	19	10	1	6.8
December.....	1.81	4.17	12	N.	5,622	25	NW.	17	2	27	2	0	5.5
Year.....	61.15	69.46	173	NW.	71,090	36	NW.	57	33	218	114	94	6.4

¹ Average for 22 years' record.² Tenths of sky obscured during daytime.TABLE NO. 4.—*Monthly meteorological data, year 1919, Colon, R. P.*

Month.	Atmospheric pressure (inches).		Air temperature (°F.).								Mean relative humidity (bhourly).	
	Station. ¹	Sea level.	Monthly mean.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Maximum daily range.		Mean wet thermometer.
January.....	29,822	29,860	79.6	84	8	82.5	74	12	76.7	9	74.6	80.1
February.....	29,856	29,892	80.1	84	26	82.6	72	14	77.6	10	75.2	81.3
March.....	29,861	29,878	79.6	84	30	82.5	73	28	76.8	10	74.4	79.4
April.....	29,810	29,847	80.0	86	18	83.1	73	26	77.0	9	77.2	85.7
May.....	29,786	29,822	82.0	92	18	86.3	75	23	77.6	14	77.6	85.6
June.....	29,777	29,814	80.7	92	2	85.2	71	26	76.2	14	77.5	86.9
July.....	29,804	29,841	80.2	87	6	84.2	73	8	76.3	12	77.2	87.0
August.....	29,818	29,856	80.8	87	24	85.1	73	21	76.5	13	77.0	85.2
September.....	29,792	29,830	80.6	90	12	86.1	73	4	75.2	14	76.1	84.2
October.....	29,790	29,826	80.1	90	29	85.2	71	4	75.0	16	76.4	84.4
November.....	29,806	29,844	80.0	89	8	84.6	72	8	75.5	17	75.5	80.6
December....	29,826	29,864	80.4	87	10	85.1	71	13	75.8	15	75.2	78.6
Year...	29,812	29,850	80.3	92	22	84.4	71	13	76.4	17	76.2	83.2

¹ Elevation of barometer 36 feet above mean sea level.² June.³ December.

TABLE NO. 4.—*Monthly meteorological data, year 1919, Colon, R. P.*—Continued.

Month.	Precipitation (inches).			Wind.					Number of days.				Average cloudiness. ²
	Monthly total.	Normal. ¹	Rainy days.	Prevailing direction.	Total movement (miles).	Maximum velocity.			Clear.	Partly cloudy.	Cloudy.	Thunderstorms.	
						Miles per hour.	Direction.	Date.					
January.....	1.82	3.81	20	N.	11,359	32	N.	12	3	20	8	0	5.8
February.....	.36	1.65	10	N.	9,526	28	N.	27	3	15	10	0	6.5
March.....	.61	1.59	13	N.	11,828	28	N.E.	18	5	15	11	0	6.3
April.....	10.95	4.35	23	N.	8,839	27	W.	26	1	7	22	6	8.3
May.....	6.95	12.60	18	S.E.	5,908	27	N.E.	23	0	8	23	16	8.4
June.....	12.08	13.35	24	N.	4,752	24	E.	4	0	5	25	14	8.7
July.....	13.60	15.97	28	W.	6,620	32	N.	14	0	4	27	18	8.8
August.....	6.77	14.83	22	W.	6,823	28	S.	21	0	10	21	7	8.2
September.....	11.74	12.65	20	S.E.	4,928	27	N.	7	1	13	16	8	7.7
October.....	21.94	15.03	26	S.E.	5,822	30	W.	22	1	12	18	14	8.0
November.....	6.63	21.04	22	N.	7,197	33	N.	28	2	15	13	3	6.9
December.....	7.37	11.61	23	N.E.	9,778	30	N.E.	30	6	20	5	0	5.8
Year.....	100.82	128.48	249	N.	93,380	33	N.	³ 28	22	144	199	86	7.4

¹ Average for 49 years record.² Tenths of sky obscured during daytime.³ November.TABLE NO. 5.—*Monthly evaporation in Canal Zone, years 1919 and 1920.*

[Values in inches.]

Month.	Balboa Heights.			Gaŕun.			Colon. ¹	
	1919	1920	Average 12 years.	1919	1920	Average 9 years.	1919	Average 11 years.
January.....	7.970	8.330	6.005	5.874	6.798	5.970	5.476	6.055
February.....	7.704	8.380	6.393	5.876	6.756	6.248	6.230	6.322
March.....	9.813	9.531	7.652	7.253	6.920	7.481	9.020	7.362
April.....	5.478	6.548	5.445	4.625	7.257	6.404	6.156	6.003
May.....	3.737	6.121	3.536	5.359	6.247	5.127	5.079	3.961
June.....	3.063	3.379	2.994	4.110	4.248	4.250	3.721	3.273
July.....	3.228	.....	3.260	3.842	.....	4.407	3.060	3.111
August.....	3.838	.....	3.251	4.709	.....	4.426	3.840	3.176
September.....	2.807	.....	3.163	4.592	.....	4.474	3.376	3.190
October.....	2.881	.....	3.276	3.863	.....	4.160	3.431	3.292
November.....	3.979	.....	3.146	4.677	.....	3.783	4.374	3.135
December.....	5.275	.....	4.694	4.868	.....	4.970	5.399	4.521
Year.....	59.773	.....	52.815	59.648	.....	61.700	59.162	53.401

¹ Evaporation records discontinued Jan. 1, 1920.

NOTE.—Averages do not include the year 1920.

HYDROGRAPHY.

The same hydrographic stations were operated as last year.

Tidal conditions.—Automatic tide registers were continued in operation at Balboa and Colon. The tidal extremes of record for the calendar year 1919 at these stations are given in the following table:

Station.	Maximum high water.		Extreme low water.		Maximum range. ¹		Minimum range.	
	Feet.	Date.	Feet.	Date.	Feet.	Date.	Feet.	Date.
Balboa.....	10.6	{Sept. 13..... Oct. 11-12.....}	—10.9	Apr. 2...	20.7	Apr. 2...	6.2	{Jan. 26. Feb. 25. Several dates.
Colon.....	1.70	Dec. 8.....	— .71	June 4...	1.83	{Jan. 12... Dec. 8...}	2.20	

¹ For consecutive tides.² One or more phases of a tide are often absent at Colon.

Elevations referred to zero of gage rods, approximately mean sea level.

Monthly tide data at Balboa and Colon for the calendar year 1919 are presented in Table No. 6.

Chagres River.—The outstanding feature of the Chagres River discharge was the *low* yield of the watershed. The 18 months' period, December, 1918–June 1, 1920, showed the *lowest* yield of any 18 months' period since January, 1905–July 1, 1906, the previous low record since 1902, the date of beginning of careful, continuous gagings. Inasmuch as the Chagres River usually furnishes about 40 per cent of Gatun Lake's annual total yield, it is apparent that the water supply of Gatun Lake was affected by this deficit in 1919.

The three lowest periods of 18 months' discharge of record in order of minimum flow are:

Period.	Discharge in cubic foot-seconds.
1. Jan. 1, 1905, to July 1, 1906.....	1,286
2. Dec. 1, 1918, to June 1, 1920.....	1,502
3. Jan. 1, 1911, to July 1, 1912.....	1,738
In order of minimum flow for 12 months the order is:	
1. Jan. 1, 1905, to Jan. 1, 1906.....	1,518
2. Jan. 1, 1919, to Jan. 1, 1920.....	1,886
3. Jan. 1, 1912, to Jan. 1, 1913.....	2,103

April, 1920, was the month of minimum average flow of record, 304 cubic foot-seconds in comparison with the previous minimum of 371 cubic foot-seconds in April, 1912.

The mean discharge of the Chagres River at Alhajuela for the calendar year 1919 was 1,886 cubic foot-seconds, or 28 per cent below normal, against an 18-year average of 2,616 cubic foot-seconds. The Chagres River furnished 36 per cent of the Gatun Lake total yield. The maximum monthly discharge at Alhajuela was 2,996 cubic foot-seconds in September, and the minimum monthly discharge was 469 cubic foot-seconds in March. (See Table 8 and Plates Nos. 14 and 15 for data on discharge by months.) The maximum momentary discharge at Alhajuela during the calendar year 1919 was 23,800 cubic foot-seconds at elevation 101.3 during the flood of November 5, 1919, and the minimum momentary discharge was 333 cubic foot-seconds on March 24, 25, and 26, 1919. On May 11, 1920, the minimum momentary discharge was 231 cubic foot-seconds, the lowest of record.

Freshets.—There were nine freshets in the Chagres River during the calendar year 1919, with a rise of 5 feet or more at Alhajuela, occurring during the period from April 15 to November 5. Data on the principal freshets for the calendar year 1919 and January 1 to July 1, 1920, are given in Table No. 7.

Flood warnings.—Vigia, Alhajuela, and Gatuncillo were continued as flood-warning stations. Timely warnings of all large freshets were issued to the Chagres River plantation management, the port captains, and other interests affected by flood conditions.

Current-meter gagings.—Fifty-four gagings were made at the Calle Larga gaging station (Chagres River) during the calendar year 1919, covering a range from elevation 96.20 to 107.40. Nine current-meter gagings were made during the year on each of the upper tributaries, the Pequeni, the Chagres, and the La Puente.

Gatun Lake.—The Gatun Lake watershed total yield for the calendar year 1919 was 17 per cent below normal, amounting to 5,225 cubic foot-seconds, against a nine-year average of 6,267 cubic foot-seconds. (See Tables 9 and 10, respectively, for monthly hydrology for Gatun Lake and Gatun Lake watershed for 1919.) The maximum monthly total yield was 10,531 cubic foot-seconds in October. The minimum monthly total yield was 952 cubic foot-seconds in March. The total yield of the watershed amounted to 164.78 billion cubic feet, accounted for as follows:

	Billion cubic feet.
Run-off above Alhajuela (36 per cent).....	59.45
Yield from land area below Alhajuela (44 per cent).....	71.86
Direct rainfall on lake surface (20 per cent).....	33.47
Total (100 per cent).....	164.78

The uses and disposition of this water supply were:

	Billion cubic feet.
Evaporation from lake surface (14 per cent).....	22.108
Gatun Lake lockages (11 per cent).....	18.246
Hydroelectric power (28 per cent).....	46.340
Spillway discharge (46 per cent).....	76.044
Leakage and miscellaneous uses (1 per cent).....	1.819
Increased storage.....	.230
Total (100 per cent).....	164.787

See plates Nos. 16, 17, 18, and 19 for graphical data.

With no inflow, the various uses and losses during the calendar year 1919 would have lowered Gatun Lake as follows:

- Canal lockages, from elevation 87 to elevation 83.
- Hydroelectric power, from elevation 87 to elevation 76.5.
- Spillway waste, from elevation 87 to elevation 68.8.
- Evaporation, from elevation 87 to elevation 82.2.
- Total losses, from elevation 87 to elevation 41.6.

With no losses from Gatun Lake the various sources of inflow would have raised the lake as follows:

- Direct rainfall on lake surface, from elevation 79.7 to elevation 87.
- Run-off from land surface, from elevation 51.2 to elevation 87.
- Total net yield, from elevation 40 to elevation 87.

The total net yield was equal to 81 per cent of the capacity of Gatun Lake.

Storage depletion, 1920 dry season, Gatun Lake.—The 1920 dry season began about December 16, 1919, and the dry-season weather continued to May 13, 1920, being the worst season for water supply since American occupation in 1904. Inflow of average seasonal amounts did not begin until June 1. Plate No. 19 graphically shows a study of how the Gatun Lake was affected, with comparisons with other years.

In order to conserve water supply, about 50 per cent of the usual output at the hydroelectric plant was generated at the Miraflores plant, from March 3 to June 3, 1920. The ratio of water expended in making hydroelectric power and lockages in the calendar year 1919 was 2.54 to 1; in 1920 dry season, 1.87 to 1. There were 20.46 billion cubic feet of storage depletion between January 1 and May 28, 1920, the lake falling to elevation 81.77. Had the hydroelectric plant continued at its usual rate of water consumption throughout the 1920 dry season, the Gatun Lake would have fallen to elevation 80.55, which allows a depth of water in Gaillard Cut of 40.55 feet. It is apparent from my study and curves, published in the 1918 annual report, that when the Gatun hydroelectric plant has reached its complete development, at least a partial switch of power generation to the Miraflores plant will have to be made during many future dry seasons.

BRANCH HYDROGRAPHIC OFFICE, CRISTOBAL.

The branch hydrographic office, under the port captain's office at Cristobal, is operated in connection with the Cristobal meteorological station. Corrections of navigational charts, barometers, and chronometers were made. Value of charts, books, and other aids to navigation sold or issued for official use during the fiscal year of 1919-20 amounted to \$3,668.20, an increase of 35 per cent over the previous fiscal year. There was an average of eight ship's chronometers being checked daily for time corrections throughout the year.

SPECIAL INVESTIGATIONS.

Special reports were made to you on studies or investigations during the year as below:

1. Mean tide levels—Balboa and Cristobal.
2. Comparative tide records—Balboa and Taboga.
3. Surges in Gaillard Cut from lockages at Pedro Miguel.
4. Miraflores Lake currents affecting navigation.

A summary of the latter report is as follows:

(a) The general drift of the currents due to lockages, spillway operations, and dry season prevailing winds is toward Miraflores locks. Southbound ships will experience more difficulty in navigating Miraflores Lake than will northbound vessels.

(b) Northbound vessels in either chamber of Miraflores locks should experience no important navigating difficulties on account of spillway gate No. 8 operating at 3.2-foot opening.

(c) It is not definitely known whether or not southbound vessels can safely enter Miraflores locks with spillway gate No. 8 discharging through a 3.2-foot opening. It is suggested that careful tests be made to determine this.

(d) Prevailing northwesterly winds and lockage surges cause currents in Miraflores lock west forebay to set up toward the lock gates, followed by a back surge when the current strikes the lock gates. This back surge sometimes catches the bow of an incoming vessel, deflecting its course toward the west wing wall. Neither the time nor the magnitude of this back surge can be predicted. Making fast the bow center wall towing line as soon as possible after the vessel comes alongside is suggested as a precautionary measure to prevent this deflecting tendency.

The following tables and plates accompany the hydrographic section of this report:
Table No. 6. Tidal conditions, calendar year 1919.

Table No. 7. Principal freshets in the Chagres River, calendar year 1919 and January to June, inclusive, 1920.

Table No. 8. Monthly discharge, Chagres River at Alhajuela, 1919.

Table No. 9. Monthly hydrology, Gatun Lake, 1919.

Table No. 10. Hydrology of Gatun Lake watershed, 1919.

Table No. 11. Hydrology of Miraflores Lake watershed, 1919.

Plate 14. Chagres River drainage basin; mean monthly discharge at Alhajuela; year 1919, dry season 1920, and 18-year average.

Plate 15. Chagres River drainage basin; massed curves-discharge at Alhajuela; maximum, minimum, current and average years.

Plate 16. Operating uses of Gatun Lake water supply; year 1919, dry season 1920.

Plate 17. Gatun Lake watershed; yields and losses: massed curves, year 1920.

Plate 18. Gatun Lake watershed; total yields; year 1919, dry season 1920 and 9-year average.

Plate 19. Gatun Lake watershed; comparative dry season hydrographs and curves; monthly uses and losses, dry seasons 1917, 1918, 1919, 1920.

TABLE NO. 6.—*Tidal conditions, calendar year 1919.*

[Elevations in feet referred to zero of rod, approximately mean sea level.]

PACIFIC COAST—BALBOA, CANAL ZONE.

Month.	Maximum high water.	Date.	Extreme low water.	Date.	Maximum range.	Date.	Minimum range.	Date.	Average daily range.	Monthly mean tide level.
January.....	8.3	18	- 9.1	18	17.4	18	6.2	26	12.6	+0.452
February.....	9.1	4	- 9.3	3	18.3	3-4	6.2	25	12.8	+ .206
March.....	9.8	5	-10.2	4	19.8	4	6.7	26	13.1	+ .114
April.....	9.9	30	-10.9	2	20.7	2	7.4	24	13.3	+ .322
May.....	10.3	1	-10.3	1	20.6	1	9.2	10-23	13.1	+ .738
June.....	9.5	29	- 9.1	29	18.8	1	8.3	9	12.9	+ .817
July.....	9.1	28	- 8.8	28	17.9	1-28	6.9	8	13.0	+ .833
August.....	9.5	15	- 8.1	26	17.4	15	6.4	6	13.0	+ .928
September..	10.6	13	- 8.6	12-13	19.2	13	6.3	5	12.9	+ .994
October.....	10.6	11-12	- 9.9	11	20.5	11	6.6	4	12.7	+1.054
November...	10.6	9	- 9.7	9	20.3	9	7.3	2	12.7	+ .904
December...	10.2	9	- 9.7	9	19.9	9	8.4	2	12.8	+ .915
Year..	10.6	{Sept. 13 Oct. 10-11 Nov. 9}	-10.9	Apr. 2	20.7	Apr. 2	6.2	{Jan. 26 Feb. 25}	12.9	+ .694

ATLANTIC COAST—CRISTOBAL, CANAL ZONE.

January.....	1.53	15	-0.51	1	1.83	12	0.21	24-26	0.89	+0.250
February....	.87	1	- .79	8	1.46	10	.20	22-27	.70	+ .054
March.....	.97	10	- .53	8	1.47	10	.23	17-25	.69	+ .150
April.....	1.23	29	- .54	5	1.48	5	.22	2-13	.78	+ .270
May.....	1.36	2	- .65	30-31	1.76	29	.20	2	.96	+ .220
June.....	1.26	24	- .71	4	1.73	27	.24	1-18	.97	+ .205
July.....	1.18	25	- .46	2-12-23	1.58	26	.21	20	.85	+ .220
August.....	1.23	19	- .32	6	1.46	20	.21	4	.75	+ .284
September..	1.28	17	- .38	17	1.60	18	.20	28	.69	+ .257
October.....	1.44	15	- .47	31	1.63	16	.20	10-13	.81	+ .417
November...	1.34	21	- .56	2	1.69	9	.23	8	.86	+ .386
December...	1.70	8	- .54	23	1.83	8	.22	9	.90	+ .342
Year..	1.70	Dec. 8	- .71	June 4	1.83	{Jan. 12 Dec. 8}	.20	{Several dates.}	.82	+ .255

TABLE NO. 7.—*Principal freshets in the Chagres River for the calendar year 1919 and January to June, inclusive, 1920.*

[Elevations are in feet above mean sea level.]

Date.	Vigia.		Alhajuela.				Gatuncillo.				
	Elevation of crest (feet).	Rise (feet).	Elevation of crest (feet).	Rise (feet).	Hours after Vigia.	Maximum discharge (c. f. s.).	Elevation of crest (feet).	Rise (feet).	Hours after Vigia.	Per cent of Vigia. rise.	Per cent of Alhajuela rise.
1919.											
Apr. 15.....	138.30	11.2	100.70	8.9	1½	21,200	89.72	5.7	1½	51	64
Apr. 23.....	135.80	9.3	98.90	7.4	1½	15,750	88.20	3.8	1½	41	51
May 9-10....	133.00	6.4	96.90	5.4	1½	10,150	87.18	2.1	1½	33	39
May 13-14....	136.20	9.2	99.35	7.5	1½	17,210	88.80	3.6	1½	39	48
May 23-24....	135.55	8.4	98.90	6.9	1½	15,750	(1)	(1)	(1)	(1)	(1)
June 30.....	133.40	6.4	97.50	5.6	1½	11,790	88.18	3.0	(?)	47	54
Aug. 17-18....	134.30	7.4	98.00	6.2	1½	13,120	87.90	2.5	1½	34	40
Sept. 21.....	133.80	6.3	97.80	5.6	1½	12,600	88.05	2.6	1½	41	46
Nov. 5.....	137.95	10.4	101.30	9.0	1½	23,100	90.90	4.0	2	38	44
1920.											
June 2.....	136.85	10.8	99.82	8.9	2	18,520	88.45	6.4	2½	59	72
June 21.....	133.95	7.1	97.90	6.2	1½	12,900	87.47	4.8	(?)	68	77
June 25.....	141.85	15.2	103.20	11.7	1½	29,500	91.29	8.6	2½	57	74

¹ Record lost.

TABLE NO. 8.—*Monthly discharge, Chagres River, at Alhajuela, calendar year 1919.*

[Drainage area, 427 square miles.]

Month.	Discharge in second-feet.					Inches on watersheds.		Per cent run-off to rain-fall.
	Maximum.	Date.	Minimum.	Date.	Mean.	Rain-fall.	Run-off.	
January.....	4,990	12	898	28-29	1,285	1.99	3.47	174
February.....	986	13	521	28	731	.59	1.78	302
March.....	711	12-13	333	24-26	469	.48	1.27	265
April.....	21,200	15	375	8	1,581	16.06	4.13	26
May.....	17,100	14	1,140	9	2,348	9.43	6.34	67
June.....	11,790	30	1,239	21	1,887	8.72	4.93	57
July.....	9,260	21	1,151	17	2,060	16.71	5.56	33
August.....	13,120	18	1,217	5	2,049	13.60	5.53	41
September.....	12,560	20-21	1,783	18	2,996	14.10	7.83	56
October.....	9,375	11	1,613	30-31	2,512	13.92	6.78	49
November.....	23,100	5	1,503	18	2,455	9.15	6.42	70
December.....	10,000	5	1,320	31	2,186	4.06	5.90	145
Year.....	23,100	Nov. 5.....	333	Mar. 24-26....	1,885	108.81	59.94	55
18 years.....	170,000	Dec. 26, 1909	250	Apr. 20, 1912	2,616	120.42	83.21	69

TABLE NO. 9.—*Monthly hydrology, Gatun Lake, calendar year 1919.*

[Drainage area, 1,320 square miles.]

Month.	Mean elevation above mean sea level (feet).	Operative and useful losses (c. f. s.).	Spillway discharge waste (c. f. s.).	Storage: + increase, — decrease (c. f. s.).	Evaporation from lake surface (c. f. s.).	Net yield, 3+4±5 (c. f. s.).	Total yield, 6+7 (c. f. s.).
January.....	86.75	2,023	3	— 485	819	1,541	2,360
February.....	86.05	2,004	0	—1,930	910	73	984
March.....	84.85	2,093	8	—2,151	1,002	—50	952
April.....	84.15	2,052	26	+1,173	647	3,250	3,897
May.....	85.10	2,055	2,053	+ 224	737	4,332	5,069
June.....	85.10	2,083	2,025	+ 417	590	4,525	5,115
July.....	85.12	2,110	2,584	— 52	524	4,641	5,166
August.....	85.12	2,149	2,377	— 90	647	4,437	5,084
September.....	85.22	2,102	5,807	+ 471	647	8,379	9,027
October.....	86.03	2,139	6,436	+1,419	536	9,994	10,531
November.....	86.81	2,098	4,547	+1,350	678	7,995	8,673
December.....	86.99	2,348	2,927	— 336	687	4,939	5,626
Year.....	85.61	2,106	2,411	+ 7	701	4,524	5,225

TABLE NO. 10.—*Hydrology of Gatun Lake watershed, calendar year 1919.*

[Drainage area, 1,320 square miles.]

Gatun lockages.....	2,300
Pedro Miguel lockages.....	2,637

Gatun Lake.	Elevation (feet).	Date.
Monthly mean.....	85.61	
Maximum.....	87.16	Dec. 3
Minimum.....	83.70	Apr. 12

	Quantities.	
	Million cubic feet.	Second-feet.
Gatun spillway, waste.....	76,044.4	2,411.4
Gatun spillway, leakage.....	115.6	3.7
Gatun locks, lockages and tests.....	9,535.4	302.4
Gatun locks, leakage.....	226.1	7.2
Gatun hydroelectric plant.....	46,340.2	1,469.4
Pedro Miguel locks, lockages and tests ¹	8,710.6	276.2
Pedro Miguel locks, leakage ¹	329.3	10.4
Maintaining Miraflores Lake through Pedro Miguel locks ¹	307.2	9.7
Pumping at Gamboa.....	498.8	15.8
Brazos Brook reservoir.....	341.5	10.8
(a) Total outflow.....	142,449.1	4,517.0
(b) Storage (plus increase, minus decrease).....	+230.0	+7.3
(c) Net yield (a plus b).....	142,679.1	4,524.3
(d) Evaporation (57.738 inches).....	22,107.9	701.0
(e) Total yield (c plus d).....	164,787.0	5,225.4
(f) Rainfall on lake (87.42 inches).....	33,467.6	1,061.2
(g) Yield from land area (e minus f).....	131,319.5	4,164.1
Transferred into Miraflores Lake ¹	9,347.1	296.4

	Mean area (square miles).	Rainfall (inches).	Run-off (inches).	Percentage run-off.
Lake surface.....	165	87.42	87.42	100
Land area.....	1,155	95.27	48.94	51
Total watershed.....	1,320	94.37	53.73	57

¹ Transferred into Miraflores Lake.

TABLE NO. 11.—*Hydrology of Miraflores Lake watershed, calendar year 1919.*

[Drainage area, 38.5 square miles.]

Miraflores lockages..... 2,463

Miraflores Lake.	Elevation.	Date.
Monthly mean.....	53.40	
Maximum.....	54.76	Dec. 13
Minimum.....	51.02	Mar. 29

	Quantities.	
	Million cubic feet.	Second-feet.
Miraflores spillway, waste.....	2,803.6	88.9
Miraflores spillway, leakage.....	31.5	1.0
Miraflores locks, lockages and tests.....	7,701.6	244.2
Miraflores locks, leakage.....	216.3	6.9
Miraflores power plant cooling water.....	788.4	25.0
Miraflores locks, lake regulation.....	14.0	.4
(a) Total outflow.....	11,555.4	366.4
(b) Total inflow from Gatun Lake ¹	9,361.4	296.8
(c) Storage (plus increase, minus decrease).....	-1.9	-.1
(d) Net yield (a minus b minus c).....	2,192.1	69.5
(e) Evaporation on lake (53.461 inches).....	198.7	6.3
(f) Total yield (d plus e).....	2,390.8	75.8
(g) Rainfall on lake (60.66 inches).....	225.5	7.1
(h) Yield from land area (f minus g).....	2,164.3	68.7
Includes filtration plant wash water ¹	14.3	.4

	Mean area (square miles).	Rainfall (inches).	Run-off (inches).	Percentage run-off.
Lake surface.....	1.6	60.66	60.66	100
Land area.....	36.9	67.00	25.25	38
Total watershed.....	38.5	66.74	26.73	40

¹ Includes filtration plant wash water.

SECTION OF SURVEYS.

The section of surveys has continued to attend to all Panama Railroad land and lot surveys and has maintained the established Canal Zone monuments, triangulation stations, and bench marks. The section has also made surveys and prepared maps for the various departments and divisions of the Canal, for the Army and Navy, and for the joint land commission. Attention has been given to the various features of the Canal requiring precise observation.

The report of the acting assistant engineer gives the detail of the work accomplished:

SECTION OF SURVEYS.

F. R. Fitch, Acting Assistant Engineer.

The following report of work done by the section of surveys during the fiscal year 1919-20 is submitted herewith:

BUILDING LOTS.

Colon.—Corner and grade stakes were set on 43 lots in the city of Colon. Blocks 20, 26, and 27 of the new layout were monumented.

Cristobal.—Corner and grade stakes were set on one lot in Cristobal.

Panama.—Corner and grade stakes were set on one-third of lots 2 and 3, block 23, Santa Cruz district; three 4-foot offset monuments were also set in this block.

MAINTENANCE RECORDS.

Gatun Dam.—Y-level readings were taken on the settlement hubs once a month to January, 1920, and since then quarterly readings have been taken. The settlement for the year has been normal. The readings on the lateral thrust line across the bed of the old French Canal were discontinued. This line was established in May, 1919, and read continuously for four months without detecting any movement.

South approach wall.—Precise level readings were taken on the permanent points on both sides of the wall twice a month to January, 1920, and since then once a month. The average settlement for the total length of the wall on the west side was 0.11 of a foot and on the east side 0.12 of a foot. The corresponding average for the two previous years was 0.14 of a foot.

The maximum settlement has always occurred on the south half of the wall, and the average settlement in this section for the year was 0.135 of a foot on the west side and 0.143 of a foot on the east side. The corresponding average for the previous year was 0.17 of a foot.

Caño Saddle.—Y-level readings taken over the settlement hubs on Caño Saddle showed very slight settlement, being an average of only 0.05 of a foot for the period January, 1919, to January, 1920.

Cristobal coal dock.—Readings were taken on the walls once a month to determine the spread, if any. A very slight spread was found on the north end between stations 1+33.5 and 4+33.5.

CANAL ZONE BOUNDARY.

Clearing.—The entire 5-mile limit line on the east side of the Canal was cleared and marked with 168 extra monuments. All monuments were stamped with their proper number.

The 5-mile limit line on the west side of the Canal was also cleared and marked with 10 extra monuments between regular monuments 191 and 195 or to Panama Bay.

All débris was thrown to one side and the line cleaned to the ground, making an excellent trail, with the idea of its use by the natives, thereby keeping the line open.

Ties were made between the boundary line and the following triangulation stations: Cabra, Venado, Real, Iron, Lindero, Salud, Chilibre, and Army stations Nos. 206 and S2.

TRIANGULATION.

New stations.—A new triangulation station, Cameron, was established to tie in the monuments on Fort Clayton military reservation.

Four new stations, Guayacan, Teeple, Tumba Vieja, and Pequeni, were established in the vicinity of the Upper Chagres and Pequeni Rivers as a network on which to hang the survey of Alhajuela Basin.

ALHAJUELA BASIN.

Authority was granted to make a survey of Alhajuela Basin for the purpose of determining amount of storage possible with a dam just above Alhajuela.

During the last dry season, in preparation for this survey, a triangulation net was established on the Boqueron, Pequeni, and Upper Chagres Rivers.

Y-level elevations were carried up to the junction of the Chagres and Pequeni from a bench mark at Limon. The elevation of the Limon bench was determined by simultaneous readings on the lake surface at Limon, Rio Hondo, Rio Palenque, and Gamboa. A precise level line was run connecting the benches at Limon, Rio Hondo, and Rio Palenque, and the readings at Gamboa were referred to the P. B. M. datum plane. It is proposed to complete the survey proper during the next dry season.

SUPPLY DEPARTMENT.

Pastures.—All present and proposed fence lines of Farfan pasture were traversed.

A line to form the northern boundary of a new pasture at Mandingo was run from the northwest corner of present pasture to the Canal Zone boundary line.

A line was run to form the eastern boundary of a new pasture at Bohio.

A reconnaissance of about 8 miles was made between Caimito and Bohio Peninsula to determine new areas for clearing.

Maps and areas of Bohio Peninsula and eight plantations were furnished the superintendent of cattle industry.

HEALTH DEPARTMENT.

Gatun swamp.—A survey was made of this swamp for the purpose of locating a ditch for drainage.

A map was prepared on a scale of 1-2000 showing 1 foot contours over the entire area, the locations of streams, hills, the tree line, the 6-inch water-pipe line to Tero Point, the French Canal, dredging basin and the Mindi Levee. Blue prints were furnished the chief health officer.

ELECTRICAL DIVISION.

Duct lines.—The work of checking up the duct-line maps in the Cristobal district was completed.

The same work in the Balboa district has been started and is being done as requested by the electrical engineer.

Cable line.—A survey was made for a cable line from the duct line at Balboa round-house to the new cable office at East Balboa.

Hydroelectric station, Gatun.—Two points adjacent to unit No. 3 and two points in the south tailrace were set by precise levels.

LAND OFFICE.

Las Esplanadas.—A new projective was made for a map of this section.

The map was plotted up in accordance with the notes of the new survey which was tied in to the Panama-Ancon-Balboa survey.

Miller's Claim.—A survey was made of Miller's Claim on the Rio Agua Salud, a map drawn up, and blue prints furnished the special attorney.

La Isaca Estate.—A map of this estate was prepared in accordance with the claimant's description of the calls to show the absurd lines of his claim.

Testimony was given in the case before the Joint Land Commission bearing on a map of the adjacent estate of Santa Cruz.

Cansaloma and Waterloo.—A map was prepared showing the boundary lines and area of this estate.

Playa de Flor Land Development Company and Villalobos Claims.—A survey was made of these claims which are situated in the vicinity of Toro Point. In connection with the survey, the Quebrada Pescaderitos and the trail from Playa de Flor to the mouth of the Rio Arenal was traversed. The entire coast line was located from Toro Point to Nispero and a survey was made of the tract of land claimed by the Panama Railroad at Punta Limon. The location of the Quebrada Petitpie was also definitely fixed.

FORTIFICATION DIVISION.

Military reservations.—The boundary lines were established and monumented and descriptions by metes and bounds furnished the district engineer of the following-named military reservations: Fort Clayton at Miraflores and Corozal, Fort William D. Davis at Gatun, Fort Randolph at Margarita Point, and 200-Foot Hill at Las Minas Bay.

Taboga Island.—A survey was made on Taboga Island under the instructions of the assistant engineer, fortification division.

NAVY DEPARTMENT.

Coco Solo naval reservation.—In connection with the survey and monumenting of the Fort Randolph military reservation, monuments A, B, and C of the naval reservation were reset on the actual boundary in accordance with the views of the special attorney, and a new description by metes and bounds was written up for this reservation.

Coco Solo radio station.—The coordinates of this station were computed and azimuths determined to Guantanamo, Cuba, and Key West, Fla.

La Palma radio station.—A survey was made establishing the boundary lines of the La Palma radio station on Stanley Island in San Miguel Bay.

True azimuth was determined by solar observation.

Puerto Obaldia radio station.—The boundary of this reservation was run out and monumented, the towers, buildings, etc., located, from which data a map will be made and furnished the Navy Department. Observations for azimuth and position were to be made, but owing to the cloudy weather nothing could be accomplished.

Balboa radio station.—An azimuth line was laid off on the ground at Balboa radio station on the computed azimuth Balboa-New Orleans.

MISCELLANEOUS.

Panama-Ancon-Balboa map.—All corrections and additions were made on this map.

Panama-Ancon-Balboa extension.—The extension of this survey, covering the section between Balboa Railroad station and Diablo was completed.

Coloa-Cristobal survey.—The maps for this survey were completed.

Bench marks.—It is proposed to compile a new bench-mark book, since many of the present reported bench marks are destroyed and covered by the waters of Gatun Lake. To this end all bench marks from Colon to Gatun, inclusive, have been gone over and new descriptions written up.

Precise level bench mark No. 39 at Pedro Miguel was transferred to allow grading of a hill on which it was located.

Work was begun repairing the precise level bench marks which extend from Colon to Balboa.

Balboa shops.—Precise levels were run over the crane rails in building No. 4 at Balboa shops and profile of same made and furnished the superintendent of the mechanical division.

Gatun dam.—The approximate areas of grass cut over on Gatun dam were determined and data furnished the foreman of dams and back fills.

Transmission tower 45-1.—Relocating and grade stakes were set for this tower.

Reconnaissance.—A reconnaissance trip was made and reported from Nombro de Dios to Gamboa, via Rios Nombro de Dios, Boqueron, Pequeni, and Chagres.

The East Ridge trail was covered 30 miles from Camp Young on Gatun Lake to Army station No. 8, which is about 6 miles from Cerro Bruja. From this point a cross country reconnaissance was made to Porto Bello via the mouth of the Rio Guanche.

New Chagres.—An investigation of the water supply shortage at the new village of Chagres was made and separate report made to the engineer of maintenance.

Trails.—Main trails were traversed as follows: Porto Bello, from where it crosses the Canal Zone boundary at monument No. 87 to the north line of the Fort Clayton military reservation; Macambo, from where it leaves the Canal Zone at boundary monument No. 80 on the Rio Cardenas to its junction with the Porto Bello trail to the south.

Miraflores trail cleared from the main highway across the Rio Caimitillo to the Macambo trail opposite boundary monument No. 81.

The clearing of Miraflores trail was finished from opposite triangulation station Caimitillo to triangulation station Iron.

The traverse of the Macambo-Agua Buena trail was continued from Canal Zone monument No. 80 on the Rio Cardenas to the second crossing of the Rio Manteca somewhere in the vicinity of monument No. 74.

The Rio Agua Salud-Rio Pilones Ridge trail was cleared from Gatun Lake toward the Canal Zone boundary for a distance of $1\frac{1}{2}$ miles.

Several trails between New Chagres and Gatun were investigated to find one suitable for the use of the natives. A separate report of this was made to the engineer of maintenance.

Miles of lines.—Transit, 46; stadia, 166; stadia side shots, 102; Y level, 129; precise level, 13; total, 456.

SECTION OF OFFICE ENGINEER.

The details of the work accomplished by this section are given in the report of the office engineer, which follows:

SECTION OF OFFICE ENGINEER.

C. J. Embree, Office Engineer.

This section has continued to handle the engineering, architectural, electrical, and miscellaneous design work required for all divisions of the Canal except the mechanical division.

The principal work handled has continued to be that of the electrical and building divisions. The various building and construction projects are described in full in the annual reports of the divisions concerned and will not be repeated here, except by general mention of the most important projects.

Administration building, Coco Solo air station.

Fifty-five thousand barrel concrete oil tank.

Complete set of buildings for Fort Clayton and Fort Davis, including officers' quarters, barracks, stables, incinerator, headquarters building, etc.

A total of 685 working drawings was issued during the year, the work accomplished for the different divisions being as follows:

	Trac- ings.
Building division.....	352
Electrical division.....	278
Police and fire department.....	2
Municipal division.....	15
Locks division.....	12
Panama Railroad.....	8
General.....	18
Total.....	685

During the year the average number of men working was $13\frac{1}{2}$, with an average of 3 on vacation, making a total of $16\frac{1}{2}$ men on the rolls.

During the year we installed a new 60-inch blue-print machine, with a print washer, also a 25 k. w. motor generator set and control equipment.

During the year the following prints were issued:

	Square feet.
Blue prints.....	224,670
White prints.....	19,653
Brown prints.....	8,715

The average cost of blue and brown prints, including labor and material, has been \$0.0118 per square foot.

Respectfully submitted.

JAY J. MORROW,
Engineer of Maintenance.

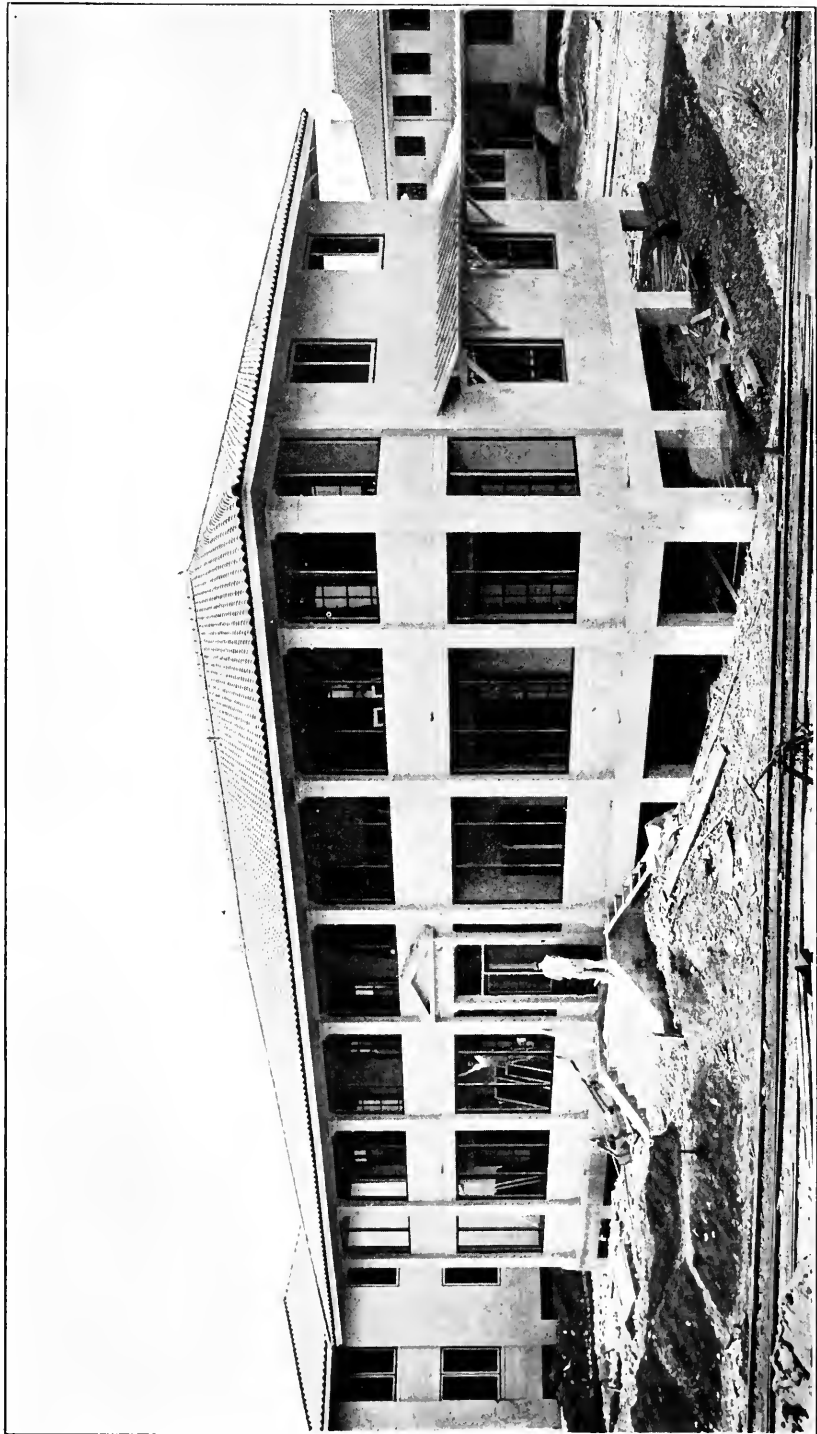
BRIG. GEN. CHESTER HARDING, UNITED STATES ARMY,
Governor, The Panama Canal, Balboa Heights, Canal Zone.



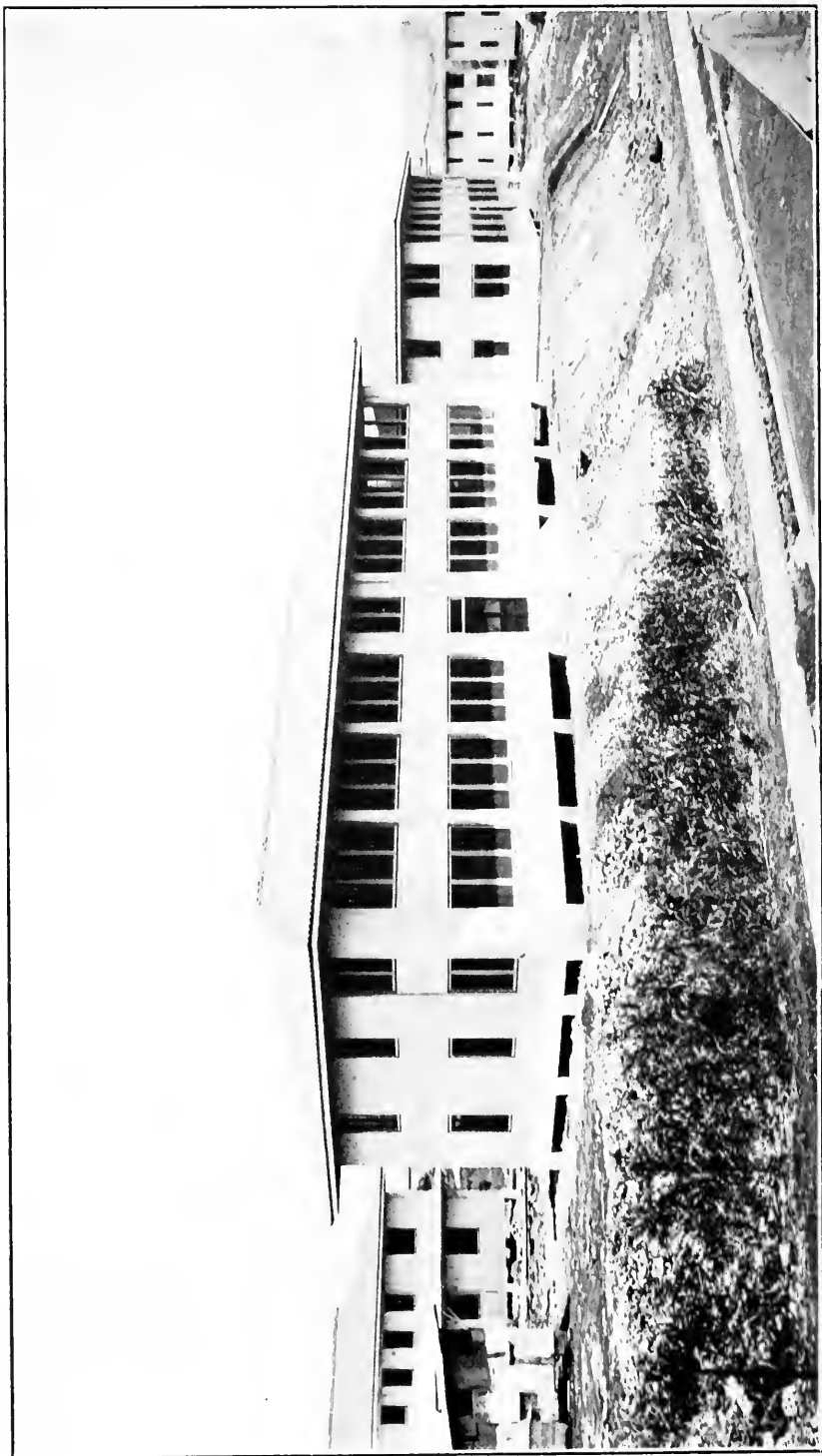
RECIMENTAL HEADQUARTERS.



TWO-FAMILY FIELD OFFICERS' AND CAPTAINS' QUARTERS.



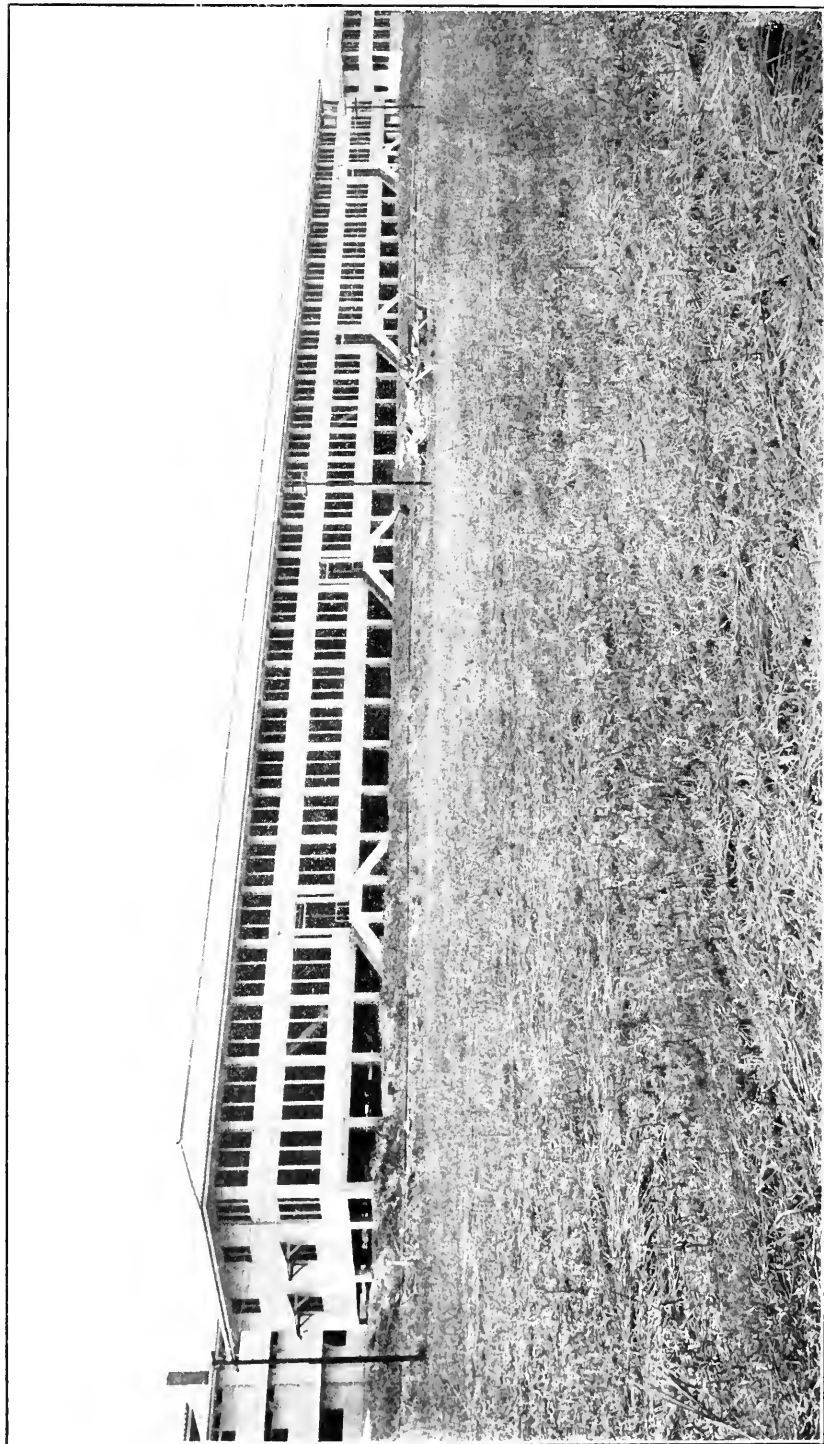
SIX SET LIEUTENANTS' QUARTERS.



FOUR-FAMILY LIEUTENANTS' QUARTERS.



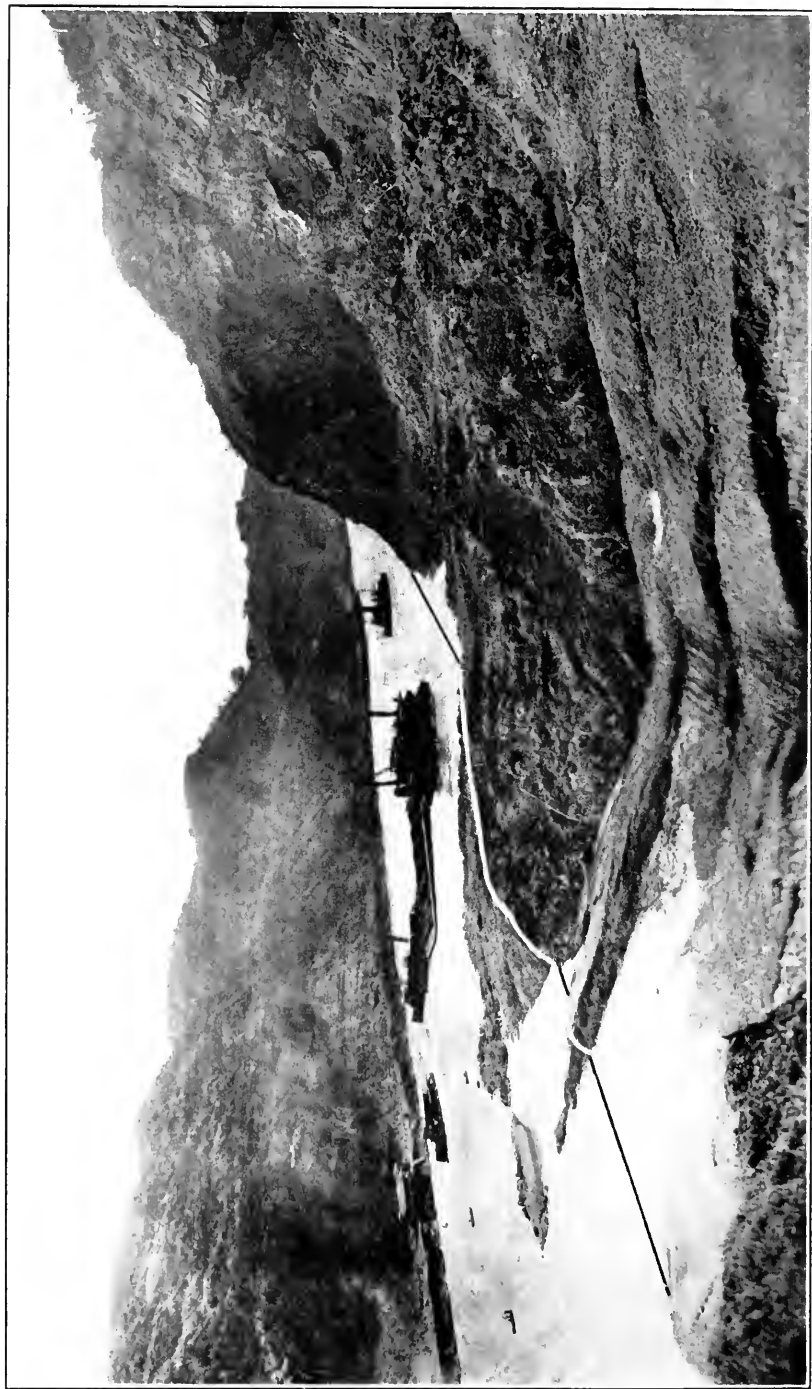
FOUR-FAMILY NONCOMMISSIONED OFFICERS' QUARTERS.



SPECIAL BARRACKS.



BATTALION BARRACKS.

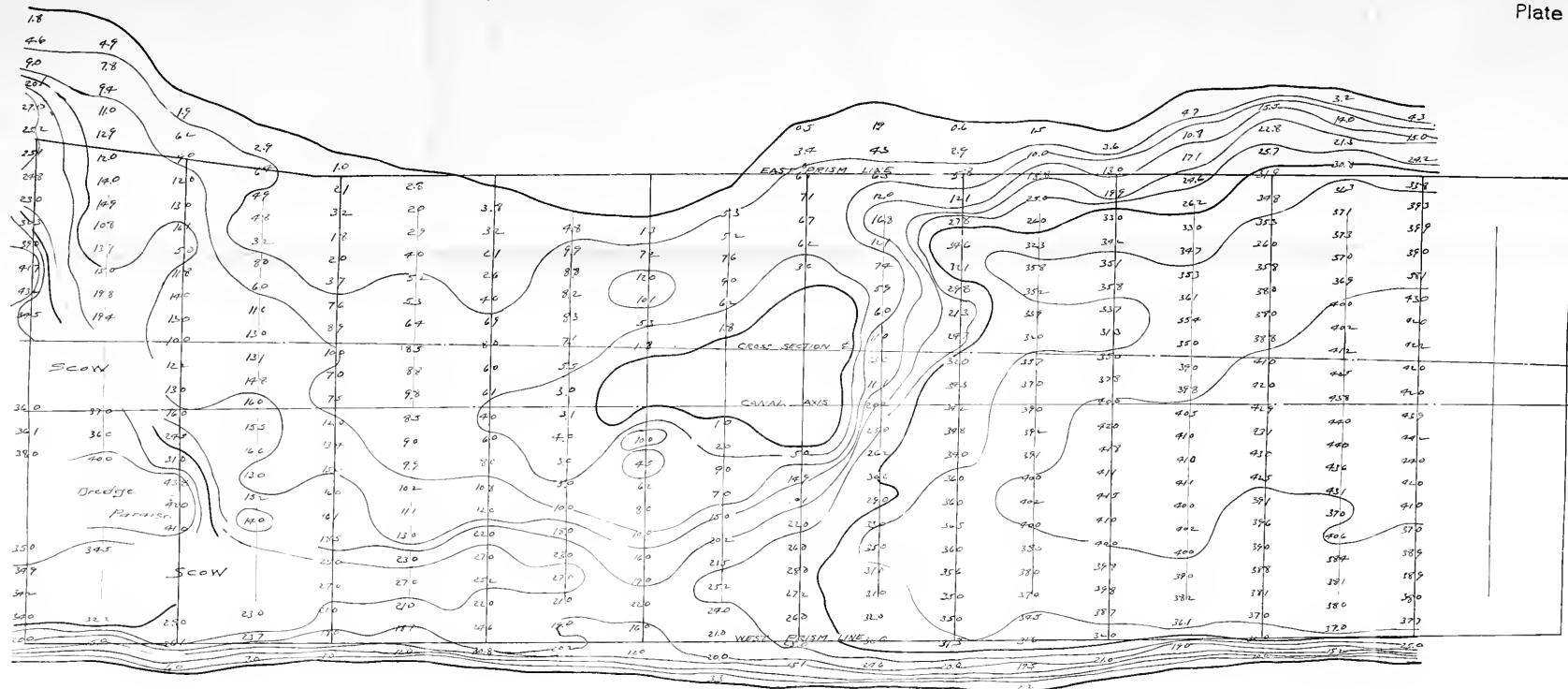


GAILLARD CUT, CUCARACHA SLIDE. MAY, 1920. LINE INDICATES LIMITS OF CANAL PRISM



GAILLARD CUT. CUCARACHA SLIDE. AUGUST, 1920. LINE INDICATES LIMITS OF CANAL PRISM.





THE PANAMA CANAL
DREDGING DIVISION
HYDROGRAPHY
STA. 1805+00 to 1814+00

Soundings are referred to Lake Level = 83.3 ft
Scale 1:800 March 21 - 22

1802.5

1806

1807

1808

1809

1810

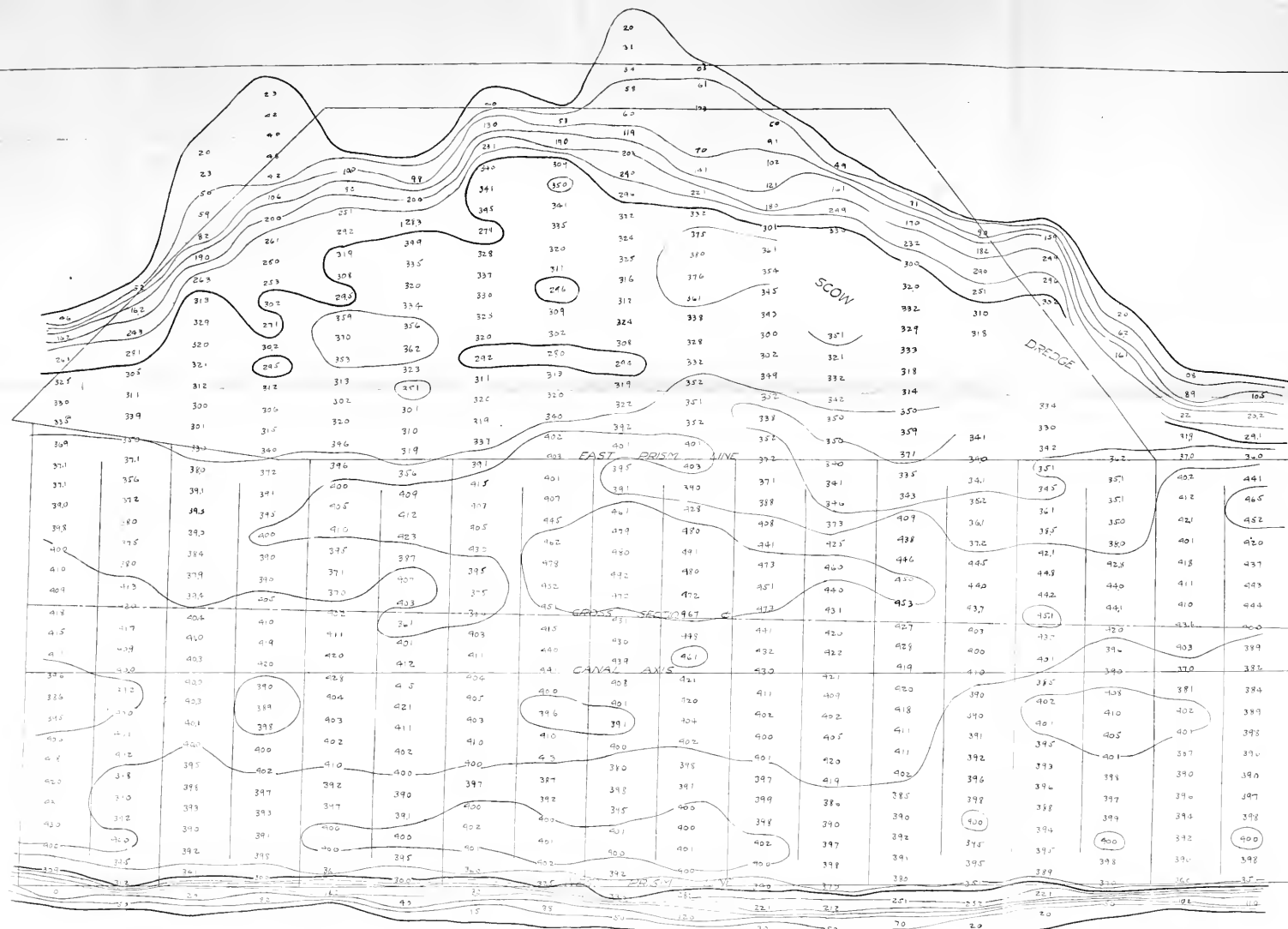
1811

1812

1813

1814

1815

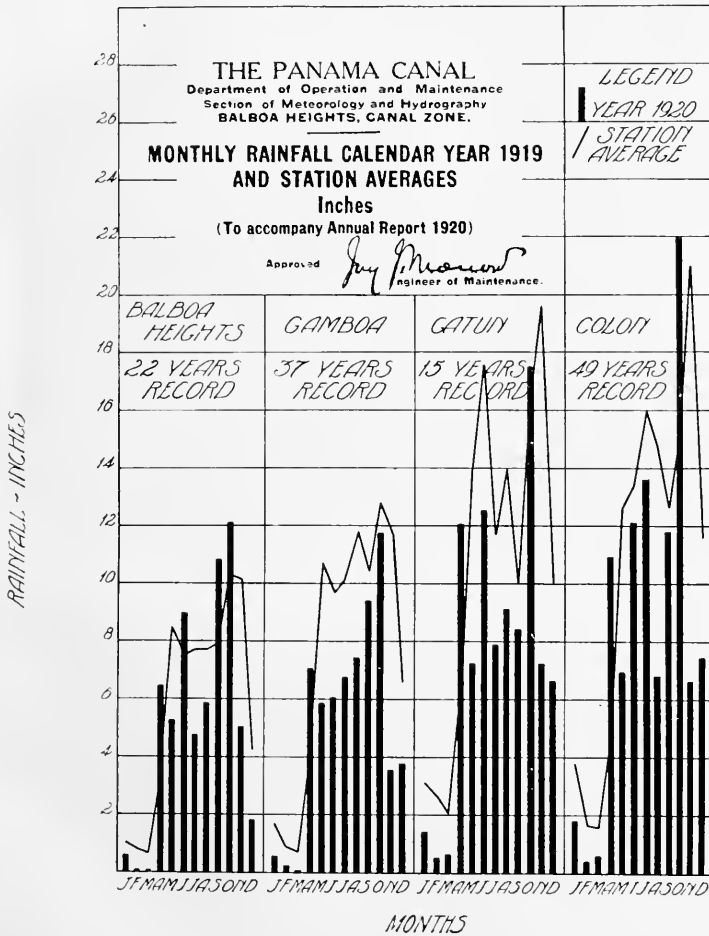


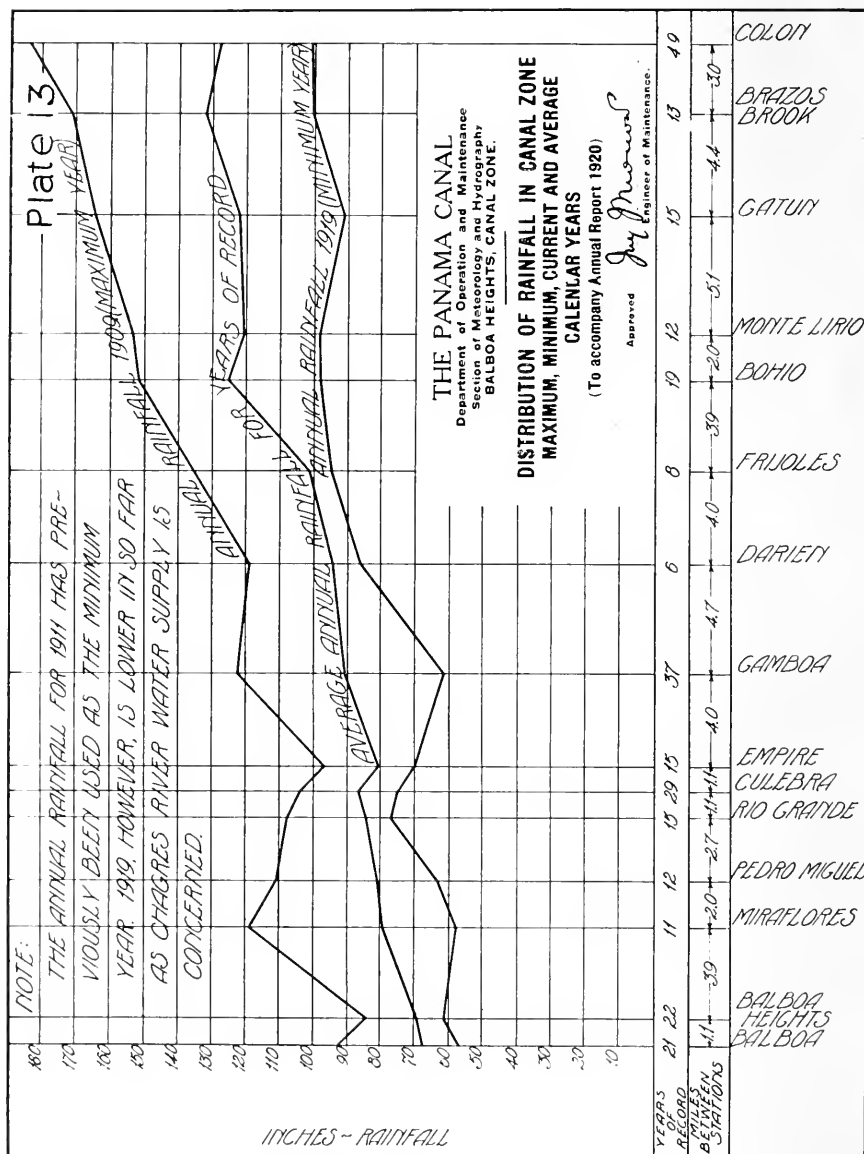
Cucaracha Slide
Excavated Oct. 22 and Aug. 3 1920
Previously reported in Sept. 1920
Excavated Sept. 18 1920

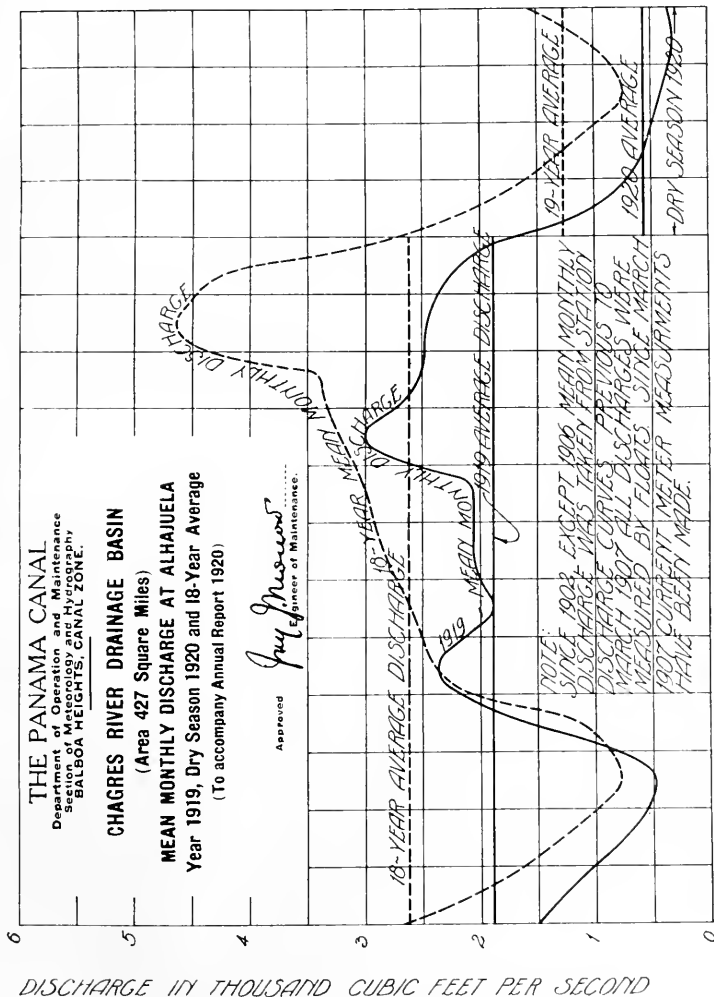
Total to date

842.985
26.10
3100
872.195

THE PANAMA CANAL
DREDGING DIVISION
HYDROGRAPHY
Station 1805+00 to 18400
Soundings are referred to Low level 85.60
Scale 1:800 Sept. 10 1920







JAN. FEB. MAR. APR. MAY' JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR.

THE PANAMA CANAL
Department of Operation and Maintenance
SALBOA HEIGHTS, CANAL ZONE.

CHAGRES RIVER DRAINAGE BASIN
(Area 427 Square Miles)

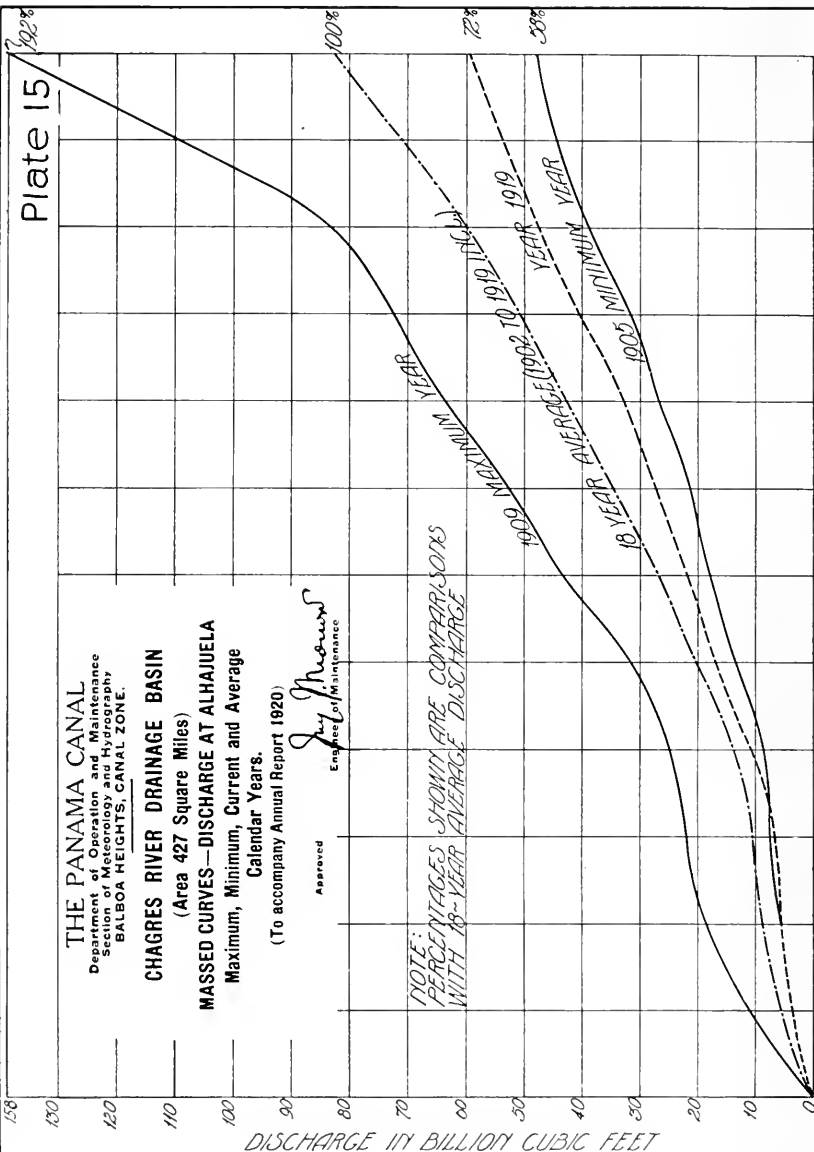
MASSED CURVES—DISCHARGE AT ALHAJUELA
Maximum, Minimum, Current and Average
Calendar Years.
(To accompany Annual Report 1920)

Approved *Jay M. Mount*
Engineer of Maintenance

NOTE:
PERCENTAGES SHOWN ARE COMPARISONS
WITH 18-YEAR AVERAGE DISCHARGE

DISCHARGE IN BILLION CUBIC FEET

JAN FEB MAR APR MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.









THE PANAMA CANAL
Department of Operation and Maintenance
Section of Meteorology and Hydrography
BALBOA HEIGHTS, CANAL ZONE.

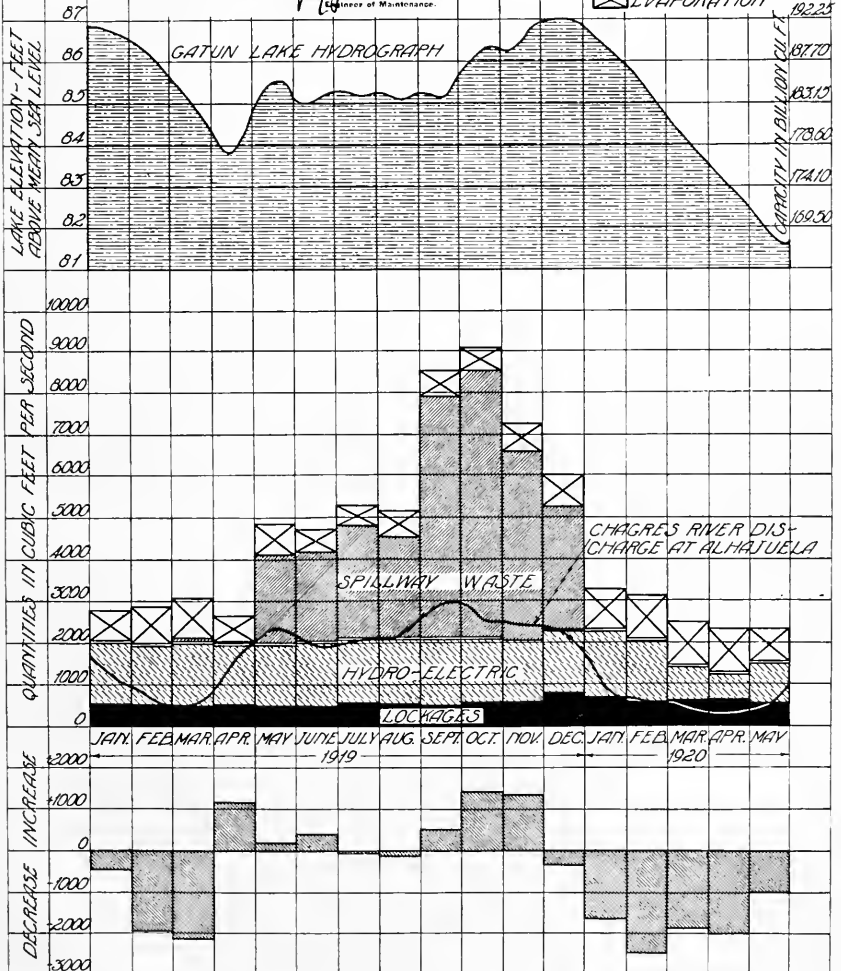
OPERATING USES OF GATUN LAKE
WATER SUPPLY
YEAR 1919—DRY SEASON 1920
(To accompany Annual Report 1920)

Approved

J. F. Munn
Engineer of Maintenance.

LEGEND

-  STORAGE
-  LOCKAGES
-  HYDRO-ELECTRIC
-  LEAKAGES & MUN. USES
-  SPILLWAY WASTE
-  EVAPORATION



THE PANAMA CANAL
Department of Operation and Maintenance
Section of Meteorology and Hydrography
BALBOA HEIGHTS, CANAL ZONE.

GATUN LAKE WATER SHED
(Area 1320 Square Miles)

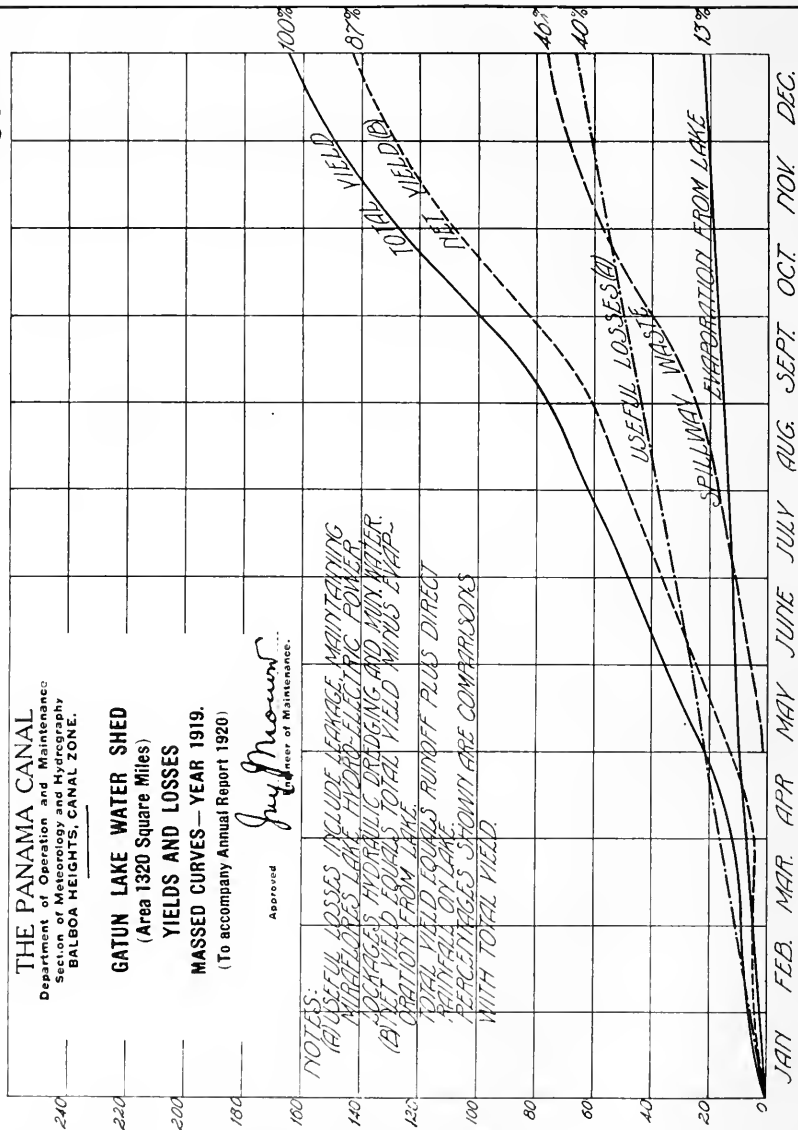
YIELDS AND LOSSES

MASSED CURVES—YEAR 1919.
(To accompany Annual Report 1920)

Approved
Jay M. Mount
Engineer of Maintenance.

NOTES:
(A) USEFUL LOSSES INCLUDE LEAKAGE, MAINTAINING
WHEELWORKS, LEAK, HYDRO-ELECTRIC POWER,
BOOMAGES, HYDRAULIC DREDGING AND MIN. WATER.
(B) NET YIELD FOUNDS TOTAL YIELD MINUS EVAP-
ORATION FROM LAKE.
(C) TOTAL YIELD EQUALS RUNOFF PLUS DIRECT
RAINFALL ON LAKE.
PERCENTAGES SHOWN ARE COMPARISONS
WITH TOTAL YIELD.

VOLUME IN BILLION CUBIC FEET



THE PANAMA CANAL
Department of Operation and Maintenance
Section of Meteorology and Hydrography
BALBOA HEIGHTS, CANAL ZONE.

GATUN LAKE WATER SHED
(Area 1320 Square Miles)

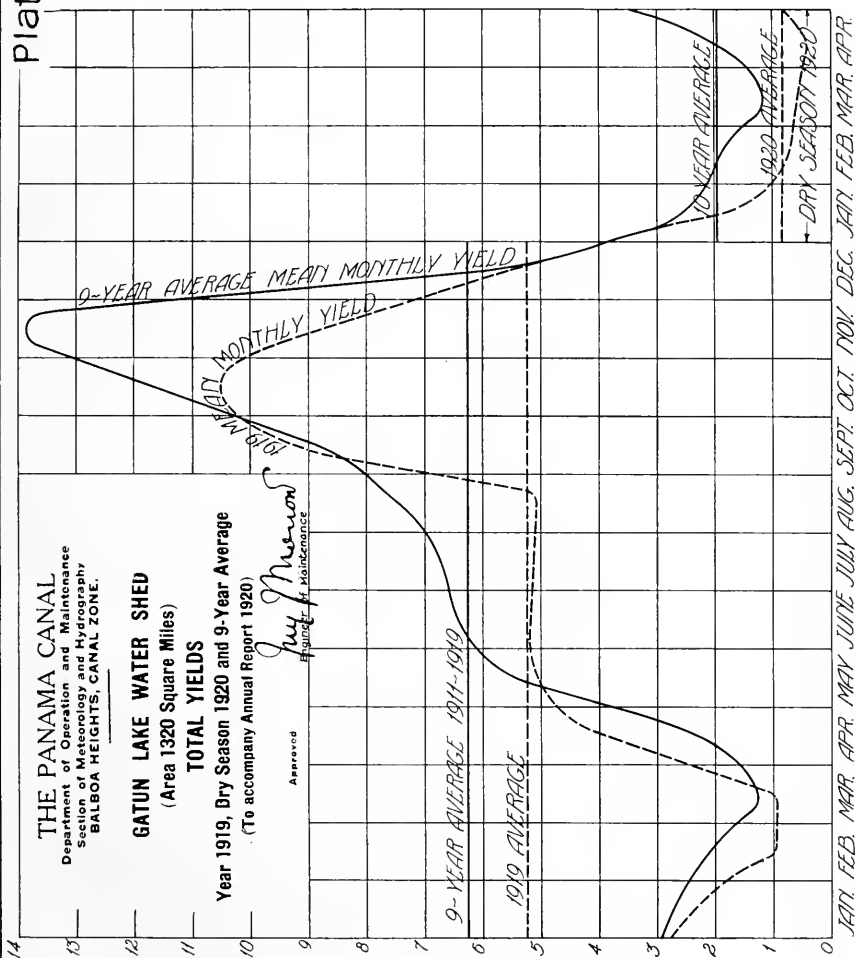
TOTAL YIELDS

Year 1919, Dry Season 1920 and 9-Year Average
(To accompany Annual Report 1920)

Wm. M. Mason
Engineer in Charge of Maintenance

Approved

TOTAL YIELD IN THOUSAND CUBIC FEET PER SECOND



THE PANAMA CANAL

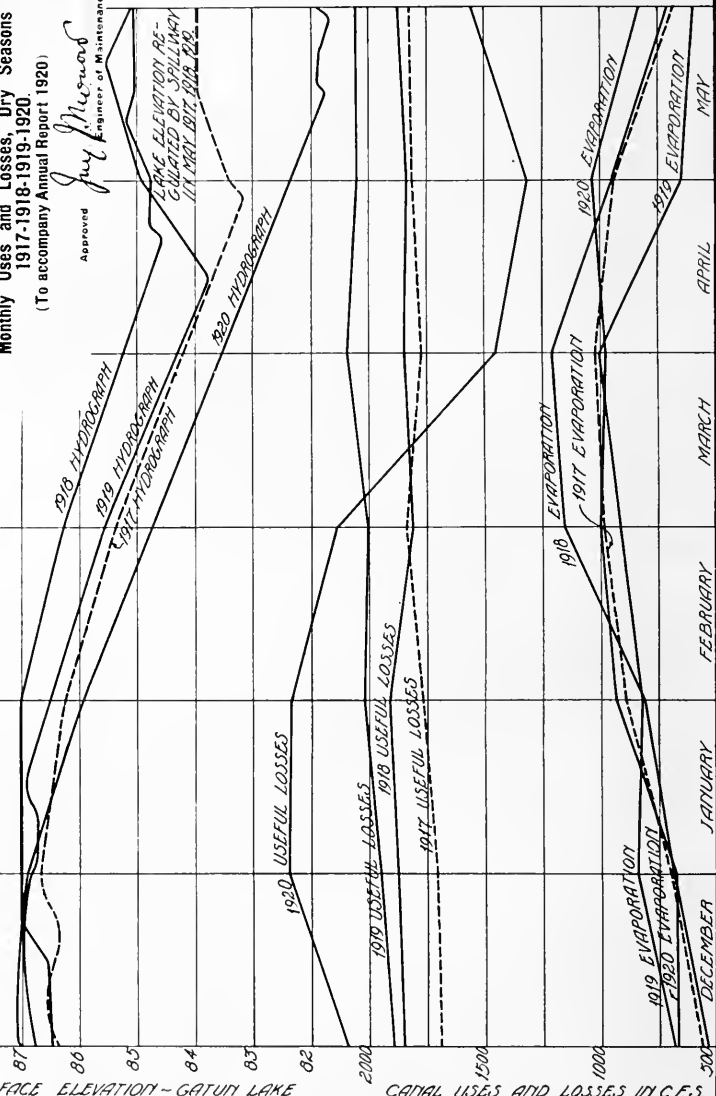
Department of Operation and Maintenance
Section of Meteorology and Hydrography
BALBOA HEIGHTS, CANAL ZONE.

GATUN LAKE WATER SHED COMPARATIVE DRY SEASON HYDROGRAPHS AND CURVES.

Monthly Uses and Losses, Dry Seasons
1917-1918-1919-1920
(To accompany Annual Report 1920.)

Approved *J. M. Woodward*
Engineer of Maintenance.

★ HYDROELECTRIC LOAD PARTLY CONT- AINED AT MIRAFLORES FROM MARCH 1, 1920 TO JUNE 3, 1920	DRY SEASON WATER USES		STORAGE DECLINATION C.F.S. BILLION FT.
	AMOS	HYDRO. USE	
	JAN-APR.	C.F.S.	
	1917	12.45	510
	1918	12.45	568
	1919	14.17	533
	1920	11.32*	604



SURFACE ELEVATION - GATUN LAKE

CANAL USES AND LOSSES IN C.F.S.

APPENDIX B.

REPORT OF THE MARINE SUPERINTENDENT, MARINE DIVISION, DEPARTMENT OF OPERATION AND MAINTENANCE.

BALBOA HEIGHTS, CANAL ZONE, *July 20, 1920.*

SIR: The following report is submitted, covering the operation of the marine division for the fiscal year ended June 30, 1920:

On April 15, 1920, the undersigned relieved Capt. L. R. Sargent, United States Navy, as marine superintendent.

The terminal ports and the lighthouse subdivision remained throughout the year in charge of the officials named in the last report.

Due to activity of the Cucaracha slide, the Canal was closed to navigation for five days, March 21-24, 1920. Restriction of the channel by the slide since February 21 increased the number of casualties to shipping, through no fault of the personnel; but, fortunately, no serious damage was caused through this condition, although some of the largest ships in the world, notably the *Renown* and the *Mount Vernon*, were passed through during these slide conditions, reflecting credit on the efficiency of the pilot personnel.

The Panama Canal tugs *La Boca* and *Miraflores*, loaned to the War Department for distant service, were returned.

The U. S. S. *Favorite*, a vessel of 500 tons dead-weight, equipped with marine repair shop, wrecking apparatus, and powerful towing engine, and prepared to lift 25 tons, was received from the Navy Department for use and custody and commissioned as salvage vessel and lighthouse tender. She fills a long-felt need.

All rear range lights were changed from fixed to flashing. Two spar buoys, which marked the anchorage for vessels carrying explosives in Cristobal Harbor, were removed.

The two-story concrete building at Gatun, designed to meet the combined storehouse, repair, and office requirements of the lighthouse subdivision, was completed, replacing an old and poorly appointed wooden structure and enabling that subdivision to operate with increased efficiency under improved working conditions.

In order to permit the assignment of pilots in rotation to duty at Gatun and Pedro Miguel locks, up to the present attended by annoyance resulting from shortage of quarters at those points, the marine division is erecting in each of these towns two 2-story frame houses, for occupancy by lock pilots only.

The following is a condensed statement of the operation of the board of local inspectors:

On June 28, 1920, Lieut. Harry Champeno, United States Navy, was appointed engineer member, vice Lieut. Malcolm C. Davis, United States Navy, detached. Lieut. Commanders John G. Fels and Charles Svensson, United States Naval Reserve Force, continued as chairman and member, respectively.

Semiannual inspections of all floating plant of The Panama Canal and Panama Railroad Company were made and reports submitted. Forty-two hulls of commercial

ships and Canal and railroad plant were inspected in dry dock. Annual inspections were made of 3 American and 17 foreign steamers and 132 motor boats, 59 of the latter being owned by The Panama Canal, 5 by the Panama Railroad Company, and 68 by individuals and companies. Certificates of seaworthiness were issued to all these craft, except to the American steamer *Culobra*, which was reconverted into a dredge and had no need of certificate. The Paraiso bridge, both pontoon and superstructure, was inspected and recommendations concerning it were made to the Panama Railroad Company. Reports and recommendations were made in connection with surveys and appraisals of various Canal craft. Inspection and hydrostatic test were made of 67 boilers, 60 of which were on Canal and railroad floating plant and 7 of which were on United States Army craft.

Licenses were issued to 10 pilots, 13 masters, 21 mates, 30 engineers, and 126 navigators of motor boats. By indorsement one pilot's license was extended and the grade of one license as navigator of motor boats was raised. Licenses were denied 5 engineers and 28 navigators of motor boats. Two certificates of loss of motor boat navigators' licenses were issued.

SHIPPING STATISTICS.

The total number of ships making the transit of the Canal in sea-going commercial traffic was 2,478, of which 1,180 were in transit from the Atlantic to the Pacific and 1,298 from the Pacific to the Atlantic; this does not include 32 launches, each of less than 10 tons register, and 7 yachts aggregating 764 tons, Panama Canal measurement. The aggregate gross registered tonnage of the 2,478 commercial vessels was 11,057,819, and their aggregate registered net tonnage 7,034,875. Their total net tonnage, Panama Canal measurement, was 8,545,653 tons.

The commercial cargo carried through the Canal amounted to 9,374,499 tons of 2,240 pounds. Of this, 4,092,516 tons were from the Atlantic to the Pacific and 5,281,983 tons were from the Pacific to the Atlantic.

The total number of ships passing through the Canal in ballast was 329, with an aggregate Panama Canal net tonnage of 1,129,616; 105 with a tonnage of 458,383 were northbound and 224, with a tonnage of 761,233, were southbound.

The total number of United States Government vessels making the transit of the Canal free of tolls was 266, of which 51 were bound from the Pacific to the Atlantic and 215 from the Atlantic to the Pacific. These consisted of 218 Navy vessels, 18 Army vessels, and 30 merchant ships with cargo for the Navy. A total of 365,898 tons of cargo was carried by these vessels; 150,814 tons by Navy vessels, 27,275 by Army vessels, and 187,809 by merchant vessels under control of the Navy. Four British tugs, with a tonnage of 413, Panama Canal measurement, but with minus United States equivalent tonnage, passed through the Canal free of tolls.

Eight vessels, carrying passengers only, with an aggregate Panama Canal net tonnage of 56,940, and 24 vessels, with no cargo, but carrying excess bunker coal, with an aggregate Panama Canal net tonnage of 67,675, were included in the year's commercial traffic.

The total number of commercial vessels without cargo, including those in ballast, ships with no cargo, but carrying excess bunker coal, and vessels with passengers only, but not including launches and yachts, was 361, with an aggregate Panama Canal net tonnage of 1,254,231. Five naval vessels of other nations, totaling 69,536 tons displacement, were also included in this traffic.

Laden vessels totaled 2,117. Of these 927 were in transit from the Atlantic to the Pacific and 1,190 from the Pacific to the Atlantic, with aggregate net tonnages of 3,379,430 and 3,911,992, Panama Canal measurement, respectively.

The average net tonnage of the commercial vessels was 3,449, Panama Canal measurement, that of the laden vessels was 3,444, and that of the vessels without cargo 3,474. The average cargo of the 2,117 laden vessels was 4,428 tons. Over the total of 2,478 vessels passing through the Canal the average of cargo was 3,783 tons per vessel. The ratio of cargo to net tons of ships carrying cargo was 1.286 tons of cargo to each net ton. Distributed over the entire commercial traffic the ratio was 1.10 tons of cargo per net ton.

During the preceding fiscal year 2,025 ships of 6,131,575 net tons, Panama Canal measurement, carried 6,877,649 tons of cargo through the Canal. The traffic for this fiscal year shows an increase in vessels, tonnage, and cargo amounting, respectively, to 22.37 per cent, 39.38 per cent, and 36.31 per cent, with respect to the traffic of the preceding year. Comparison with traffic in other years is given in the appended Table No. 1. All previous traffic records, based on the number of commercial vessels through the Canal, are exceeded this year by 16.34 per cent.

Vessels classified by nationalities in the respective numbers of each made the transit through the Canal during the fiscal year as follows: United States, 1,129; British, 753; Japanese, 118; Norwegian, 106; Chilean, 79; Peruvian, 75; French, 60; Spanish, 41; Dutch, 29; Italian, 26; Swedish, 19; German, 17; Danish, 9; Panamanian, 4; Brazilian, 3; Chinese, Portuguese, and Russian, 2 each; and Belgian, Colombian, Costa Rican, and Uruguayan, 1 each. Comparison with the number of vessels of various nations making the transit during preceding years is given in appended Table No. 2.

Respectfully,

E. P. JESSOP,
Marine Superintendent.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal, Balboa Heights, Canal Zone.

TABLE No. 1.—Summary of commercial traffic through The Panama Canal during fiscal year 1920 and since its opening to commercial traffic.

	Atlantic to Pacific.				Pacific to Atlantic.				Total.		
	Vessels.	Canal tonnage.		Tons of cargo.	Vessels.	Canal tonnage.		Tons of cargo.	Canal tonnage.		Tons of cargo.
		Gross.	Net.			Gross.	Net.		Gross.	Net.	
1919.											
July.....	67	291,708	223,490	235,874	91	380,380	287,333	332,298	672,088	510,823	598,172
August.....	88	402,170	314,512	362,313	100	335,673	271,599	353,411	757,843	586,111	715,724
September.....	72	346,348	265,725	317,358	98	418,702	320,461	320,912	765,050	586,186	638,270
October.....	73	363,369	281,903	298,131	123	509,037	388,197	437,750	873,006	670,100	705,881
November.....	88	363,523	274,251	215,554	92	408,998	322,897	339,926	772,521	597,148	575,480
December.....	140	632,917	487,114	405,697	120	570,399	440,612	518,782	1,203,316	927,726	924,479
Total for first half fiscal year.....	528	2,400,035	1,846,985	1,804,927	624	2,643,789	2,031,099	2,323,079	5,043,824	3,873,094	4,128,006
1920.											
January.....	113	459,631	350,973	314,510	125	532,393	414,560	580,118	992,024	765,533	894,628
February.....	99	469,757	360,502	302,610	109	443,647	342,960	477,878	913,404	703,462	780,483
March.....	123	583,485	455,058	428,473	112	477,134	364,304	466,043	1,055,619	819,362	894,516
April.....	110	521,017	407,968	398,568	110	529,464	414,503	468,953	1,050,481	822,471	867,521
May.....	105	490,765	388,990	418,678	119	590,697	463,029	556,241	1,081,462	852,019	974,919
June.....	102	464,877	358,387	424,750	99	456,128	346,375	409,671	921,065	704,712	834,421
Total for second half fiscal year.....	652	2,989,532	2,321,878	2,287,589	674	3,024,463	2,345,681	2,988,904	6,013,965	4,667,559	5,246,483
Total for fiscal year 1920.....	1,180	5,389,567	4,168,873	4,092,516	1,298	5,668,252	4,376,780	5,281,983	11,057,819	8,540,653	9,374,499
Fiscal year ending June 30, 1915.....	522	2,657,865	1,851,821	2,087,398	550	2,758,922	1,920,346	2,838,757	5,416,787	3,772,167	4,926,145
Fiscal year ending June 30, 1916.....	396	1,912,816	1,271,652	1,374,057	364	1,683,683	1,113,632	1,689,314	3,396,529	2,385,284	3,063,371
Fiscal year ending June 30, 1917.....	879	4,170,733	2,825,460	2,960,589	927	4,360,088	2,992,147	4,122,456	8,530,821	5,817,607	7,083,045
Fiscal year ending June 30, 1918.....	914	3,985,042	2,743,961	2,638,487	1,154	5,433,297	3,838,981	4,897,308	9,371,339	6,582,942	7,535,765
Fiscal year ending June 30, 1919.....	861	3,458,417	2,675,009	2,740,870	1,167	4,418,186	3,416,910	4,182,553	7,876,603	6,121,923	6,923,423
Fiscal year ending June 30, 1920.....	1,180	5,389,567	4,168,873	4,092,516	1,298	5,668,252	4,376,780	5,281,983	11,057,819	8,540,653	9,374,499
Total.....	4,752	21,527,470	15,536,776	15,836,907	5,460	24,322,428	17,588,800	23,012,371	45,849,898	33,225,576	38,906,278

TABLE No. 2.—Number of commercial vessels of various nationalities passing through The Panama Canal, including 172 vessels carrying cargo for United States Government, free from tolls.

	Argentinian.	Belgian.	Brazilian.	Canadian.	Chilean.	Chinese.	Colombian.	Costa Rican.	Cuban.	Danish.	Dutch.	Ecuadorian.	French.	German.	Greek.	Honduran.	Italian.	Japanese.	Mexican.	Nicaraguan.	Norwegian.	Panamanian.	Peruvian.	Portuguese.	Russian.	Spanish.	Swedish.	United States.	Uruguayan.	Total.		
ATLANTIC TO PACIFIC.																																
1919:																																
July.....			34	2							2						1	4				3	1	2			1	23		67		
August.....			37	3							2						1	6				3		2			2	20		88		
September.....			25	4	1						2							2				4		3			2	27		72		
October.....			32	2							2						1	6				5		2		3	2	18		73		
November.....		1	29	3							3						2	2				4		6		6		28		88		
December.....		1	33	4	1						1						3	21				4		3		1	7	59	1	140		
1920:																																
January.....			29	4													1	7				8		3		1	4		50		113	
February.....			28	2													1	8				7		3				47		99		
March.....			37	6							1						2	7				6		4		1		55		123		
April.....			32	3							3						2	7				4		4				60		110		
May.....			36	2							3						2	5				2		2				52		105		
June.....			41	3													2	5				2		3				45		102		
Total, fiscal year 1920.			303	38						4	17						13	84				46		37		1	2	20	10	483	1	1,180
Total, fiscal year 1919.			306	2						37	37						47	56				56		34			3	2	268		860	
Total, fiscal year 1918.			303	50						44	31						2	33				145		41			5	12	224		921	
Total, fiscal year 1917.			371	50						26	36						1	64				1		43			1	10	7	198		905
Total, fiscal year 1916.			193	16						10	11						1	19				19		16			1	5	114		411	
Total, fiscal year 1915.			226	1						10	5						2	1				1		2			8		231		530	
Total.....			1,792	3	218	4	1	27	3	131	106		63	9	2	3	18	241	6	2	356	14	173	1	12	37	54	1,528	1	4,807		
PACIFIC TO ATLANTIC.																																
1919:																																
July.....			26	2														4				1		3				51		91		
August.....			25	4						1								1				7		2							100	
September.....			26	3														1				5		4							98	
October.....	1		38	3							2							2				3		3			1	53			123	
November.....			35	3							1							5				4		3							92	
December.....			32	7						1	2						1	2				8		3			4	3	50		120	

1 German ships seized in Canal Zone waters, and issued United States registers after transit of Canal.

TABLE No. 2.—Number of commercial vessels of various nationalities passing through *The Panama Canal, etc.*—Continued.

	Argentinian.	Belgian.	Brazilian.	British.	Canadian.	Chilean.	Chinese.	Colombian.	Costa Rican.	Cuban.	Danish.	Dutch.	Ecuadorian.	French.	German.	Greek.	Honduran.	Italian.	Japanese.	Mexican.	Nicaraguan.	Norwegian.	Panamanian.	Peruvian.	Portuguese.	Russian.	Spanish.	Swedish.	United States.	Uruguayan.	Total.	
PACIFIC TO ATLANTIC—Con.																																
1920:																																
January.....			1	27		3						2		7				4	7			2	1	3				4	64		125	
February.....				23		2					1	1		6	1			3	3			9		3				6	53		109	
March.....				27		3			1		1			6	2			1	3			5		3				1	51		112	
April.....				35		4						1		2	4			1	4			3		3				1	51		110	
May.....				39		3						2		1				2	2			5		3				1	51		119	
June.....				27		4		1			1			1	5			1	6			2		3				1	41		99	
Total, fiscal year 1920.....		1	1	360		41		1	1		5	12		51	12		13	34				60	1	38	1		21	9	636		1,298	
Total, fiscal year 1919.....				296		45	2	6			42	13	1	75		2		40	1			72	3	31			3	17	518		1,165	
Total, fiscal year 1918.....				396		46	2	10			56	18		33		1		20	1			151	3	42			7	14	404		1,209	
Total, fiscal year 1917.....	1			409		49		12	3		17	38		5	12		2	18	7		1	76	2	43			1	10	11	266		971
Total, fiscal year 1916.....				165		17					8	4		1				2	5			26	1	14				8		124		376
Total, fiscal year 1915.....				239		19					13	2		1			1	1	2			26	2	2		1		10	239		558	
Total.....	2	2	1	1,865		217	4	1	29	3	141	87	1	166	14	3	3	17	119	9	1	411	9	170	1	4	41	69	2,187		5,577	
Total in both directions by fiscal years:																																
1920.....						79	2	1	1		9	29		60	17		26	118				106	4	75	2	2	41	19	1,129	1	2,478	
1919.....		1	3	753		93	4	1	12		79	19	1	104		3		87	1					65	3	5	29	786		2,025		
1918.....				602	2	96	2	20	100	49	52	49		52		2	286	4	53	1				83	2	12	26	628		2,130		
1917.....	1			699		99		23	6		43	74		9	6		3	1	24			2	150	7	86	2	20	18	464		1,876	
1916.....				780		99					18	15		3			3	1	24				45	6	30	1	1	13	238		1,787	
1915.....				358		33					23	7		3			3	2	6			1	42	2	4	6	18	18	470		1,088	
Grand total.....	2	2	3	3,657		435	8	2	56	6	272	193	1	229	23	5	6	35	360	15	3	707	23	343	2	16	78	123	3,715	1	10,384	

APPENDIX C.

REPORT OF THE SUPERINTENDENT, MECHANICAL DIVISION.

BALBOA, CANAL ZONE, *July 19, 1920.*

SIR: I have the honor to submit herewith the annual report relative to the operations of the mechanical division for the fiscal year ended June 30, 1920.

ORGANIZATION.

The general organization of the division has remained essentially the same as at the beginning of the year.

Superintendent, mechanical division, Commander E. G. Kintner, C. C., United States Navy.

Assistant superintendent, Mr. H. H. Evans.

Mr. G. S. Tower was appointed to the position of mechanical engineer, reporting for duty December 10, 1919. This position was previously held by Mr. W. J. Auten, who resigned on August 25, 1919, while on leave in the United States.

Mr. W. H. Stone returned from duty with the American forces in France, where he held the rank of captain, Engineer Corps (Railway Transportation), U. S. A. He reported for duty on July 10, 1919, and immediately resumed his former position of general foreman, Cristobal shops.

Mr. W. J. Daglish, on account of Mr. Stone's return, was relieved of his duties as general foreman and was appointed assistant general foreman, Cristobal shops, on July 10, 1919.

PRINCIPAL WORK PERFORMED.

There is given below an outline of the principal items of work performed during the year, listing only those on which considerable sums of money were expended.

AT BALBOA SHOPS.

(1) Completion of overhaul and repairs to ex-German merchant steamers *Uarda* (renamed *Salaverry*) and *Anubis* (renamed *Paita*). The former was delivered for operation July 14, the latter October 6, 1919, the *Anubis* having been considerably delayed by nondelivery of parts from the United States, held up by strikes.

(2) Completion of the repairs and alterations to the *Cristobal*, of the Panama Railroad Steamship Line, the work including not only a thorough overhaul but also very extensive alterations. The vessel was changed from a coal burner to an oil burner. The accommodations for officers and crew were rebuilt. The passenger space was entirely changed and greatly enlarged, as was also the cold-storage system. The overhaul included installation of new boilers, refitting of main engines and practically all auxiliaries in the ship.

(3) The steamship *Azov* was given a general overhaul of machinery and repairs, in dry dock, to the hull, including renewal of about 25 shell plates, numerous frames, and the lower half of the stem.

(4) The U. S. S. *Melville* after arriving at this plant in tow in a disabled condition, with boilers out of commission, had installed modified furnace fronts and certain changes in her oil-burning system.

(5) The U. S. battleship *Rhode Island* was placed in dry dock on account of broken outside coupling. Repairs were made to the strut fastenings, which had been loosened; new coupling and new propeller shaft were made from rough machined spares carried by the vessel. The Navy Department ordered this vessel to proceed to Mare Island Navy Yard, under one engine, when it was found, after removal of the stern tube shaft to the shop, that it was cracked; there was no material on the Isthmus suitable for the manufacture of this part.

(6) The Peruvian cruiser *Lima* received extensive repairs, particularly to the boilers and hull structure in the vicinity of the machinery spaces, the rudder, and steering gear. A new radio house was constructed, also a new pilot house.

(7) The steamship *Acajulla*, belonging to the Pacific Steamship Navigation Company, was altered from coal burning to oil burning and received extensive repairs to her hull and machinery.

(8) Repairs to United States Shipping Board vessels were made as follows: *Okiya*, *Seewickly*, *Ossining*, *Aimvrell*, *Bonham*, *Lake Fitch*, *Cauker*, *Xenia*, *Western Cross*, and *Tanka*.

(9) The Italian merchant vessel *Ansaldo San Giorgio I* received extensive repairs to her Diesel engines.

(10) The United States submarines stationed at Coco Solo were dry-docked and given miscellaneous repairs.

(11) The steamship *Lady Sybil* received general repairs.

(12) The salvage of the steamship *Olockson* (owned by the United States Shipping Board), which had been sunk near the Pacific entrance of the Canal to extinguish a fire in the cargo of gasoline.

(13) Other important ship work performed at Balboa shops was as follows:

Motor schooner *Santa Elena*: Repairs to main engines and pumps, water lines, engine room condenser, and deck.

Steamship *Guatemala*: Dock, clean and paint bottom; repairs to rudder and stern bushing.

Steamship *Achilles*: Dock, clean and paint bottom; repairs to hull.

Steamship *Coalinga*: Dock, clean and paint bottom and above load line; repairs to main engines, auxiliary machinery, boilers, oil lines, and sea valves.

Steamship *La Habra*: Dock, clean and paint bottom; repairs to engine room, boilers, propeller and stern bushing, steam and oil lines.

Steamship *Minnesotan*: Repairs to anchor windlass, circulating pump, boilers, engine room, and painting deck houses.

Steamship *Ardmore*: Dock, clean and paint bottom; repairs to hull, steering engine, smothering system, tail shaft and propeller, sea valves, boilers, main engines, auxiliary machinery and lines, booms, stack guys, awnings, and hatch, and painting deck and hold.

Steamship *Lcmpoc*: Repairs to boilers, main engines, copper pipe lines, and painting hull above water line.

Steamship *C-52*: Repairs to boilers, auxiliary machinery, main steam and auxiliary lines.

Steamship *Cethana*: Repairs to main engines and auxiliaries, oil lines, and deck.

Steamship *Petunia*: Repairs to boilers, main engines, and auxiliary machinery.

Steamship *San Joaquin*: Dock, clean and paint bottom; repairs to boilers and oil-burning system, main engines, auxiliary machinery, evaporator, deck steam lines, and rudder.

Steamship *Anita*: Repairs to boilers.

Steamship *Benjamin Brewster*: Dock, clean and paint bottom; repairs to boilers, main engines, auxiliary machinery, and hull.

Steamship *Cordelia*: Dock, clean and paint bottom; repairs to cargo pumps, cargo lines, and auxiliary lines.

Steamship *Huasco*: Dock, clean and paint bottom; repairs to hull, stern bushing, and rudder.

Steamship *S. V. Harkness*: Dock, clean and paint bottom; repairs to main engines, auxiliaries, cargo oil lines and valves, hull, spare tail shaft, and rudder.

(14) Overhaul and repairing of dredges, scows, and tugs of the dredging division. On account of the slides which took place this year, the amount of these repairs was considerably increased.

(15) The two sand cranes used in the gravel plant at Gamboa were rebuilt and reerected after having been wrecked by a windstorm.

(16) The manufacture of lumber from timber cut on the Canal Zone has been continued. The rate of consumption of several species now exceeds the rate of supply.

(17) Four new 61-foot steel-frame passenger coaches were completed in the car shop and put into active service. These cars are notable on account of being trimmed with caoba blanca, a native wood. They were finished in the natural color.

(18) Twenty-five 40-ton flat cars were rebuilt for the Alaskan Engineering Commission.

(19) The following railway equipment was built:

- 4 troop cars and 2 searchlight cars for the United States Army.
- 1 magnet car for loading scrap.

AT CRISTOBAL SHOPS.

(1) Completion of the alterations to fit the steamship *Middlebury* as a cattle carrier.

(2) The steamship *Culebra* received extensive repairs and alterations in connection with restoring her from her condition as a cattle carrier to her previous condition as a seagoing dredge. This vessel was moved to Balboa shops on April 6, 1920, for the completion of the work on account of the many interruptions at Cristobal.

(3) Extensive repairs in dry dock were made to planking and the frames of the tug *San Juan*.

(4) Salvage of the steamship *Marne* (owned by the United States Shipping Board). This vessel was raised after being sunk in Cristobal Harbor to extinguish a fire in the cargo of benzene. The vessel caught fire a second time and sank in the harbor on account of an explosion. She was again raised and unloaded.

The following Canal equipment and other vessels were in dry dock for repairs during the year:

BALBOA DRY DOCK.

(a) Canal equipment: Tugs *Bolivar*, *Cocoli*, *Empire*, *Gatun*, *Gorgona*, *La Boca*, *Miraflores*, barges Nos. 91, 131, 226; dredges Nos. 84, 86, *Cascadas*, *Corozal*, *Culebra*, *Gamboa*, *Paraíso*; scows Nos. 139, 140; caisson No. 1; supply boat No. 2.

(b) Vessels other than Canal equipment: Steamships *Transvaal*, *Trolltind*, *Fort Russel*, *Oraton*, *Joan of Arc*, *Uarda*, *Benzonia*, *Brookland*, *Middlebury*, *Azov*, *Cristobal*, *Anubis*, *Aysen*, *Bushrod*, *Guatemala*, *Huasco*, *Bonham*, *Coalinga*, *Achilles*, *La Habra*, *Ardmore*, *Lake Elkwater*, *Acajulla*, *Lake Fabyan*, *Cawker*, *Lake Fitch*, *Lake Garza*, *San Joaquin*, *Benjamin Brewster*, *Lady Sybil*, *Lake Flynnus*, *Relay*, *Cordelia*, *S. V. Harkness*, *Peru*, *Hwah Jah*; United States steamships *Chicago*, *Rhode Island*, *Melville*, *Ingraham*, *Gen. George W. Getty*, *Thornton*, *Sciota*; submarines *R-21*, *R-22*, *R-23*, *R-24*, *R-25*, *R-26*, *R-27*, *C-32*; launches *Limon*, *Vacuum*; submarine chasers No. 280, *V-12*; cable ship *Guardian*, cruiser *Lima*, tender *Perico*, Panama Railroad barge No. 13.

CRISTOBAL DRY DOCK.

(a) Canal equipment: Tugs *Porto Bello*, *Engineer*, *Tavernilla*, *Coco Solo*, *Sanidad*; barges Nos. 3, 17, 19, 26, 28, 49, 56, 150, 161; coal hoist No. 1, derrick barge No. 157, rock breaker *Vulcan*, supply boat No. 1.

(b) Vessels other than Canal equipment: Steamships *Cartegena*, *Caribbean*, *Jamaica*, *Manavi*, *Orotina*, *Nemesis*, *Paraíso*, *Poe*, *A. G. Force*, *San Blas*, *Crowley*, *Salvador*, *Cauca*, *Balboa*, *San Juan*, *Mecklenburg*, *Kuwa*, *Ottawa*, *Fasset*, *Boxley*, *Battonville*; submarines *C-2*, *C-3*, *C-34*, *C-44*; submarine chasers Nos. 284, 285; submarine patrol boats Nos. 1841, 2232, 2235; schooners *Aviator*, *Linda S.*, *Laura C. Hall*, *Ady*, *W. H. Marston*, *Balsa*; mine planters *Graham*, *C. W. Field*, No. 53; U. S. S. *Breakwater*, *Eagle* No. 14, *Eagle* No. 31; launches *Pequeni*, *Wilhelm*; Panama Railroad barges Nos. 1 and 2, Panama Steam Navigation Co. barge "S," tug *San Juan*, yacht *Louise*, United States Army barge.

The total number of vessels other than tugs, barges, and dredges worked on at Balboa and Cristobal shops during the year was:

Balboa, 422; Cristobal, 642; total, 1,064.

MISCELLANEOUS MATTERS.

1. The accounting system has been improved so as to give shipping agents itemized costs. This change assists in making estimates for work and in the administration of the plant.

2. The reclaiming mill has rolled 438,654 pounds of scrap steel and iron into rods and bars since the mill was put in service in February.

3. Metal parts to the amount of 1,202,781 pounds have been recovered from scrap and used in repairs to Panama Railroad freight cars.

4. Scrap lumber to the amount of 97,000 feet b. m. has been re-worked and used in repairs to railroad cars.

5. The boiler inspector who inspects and tests all steam boilers for The Panama Canal and Panama Railroad, except those on floating equipment, conducted 224 hydrostatic tests and 817 inspections of boilers. There are 178 boilers in service that are subject to his inspection.

6. There were 54,122 gallons of paint manufactured during the year at a total cost of \$120,448.

7. Inspections and repairs were made during the year on miscellaneous equipment as follows: Typewriters, 1,782; adding machines, 329; comptometers, 166; cash registers, 1,023; scales, 3,103.

8. The total output of native lumber of all species during the year was 1,457,805 feet b. m. The quantities of the various species are given, together with the names of the standard woods for which they were substituted.

Native specie.	Quantity produced (feet b. m.).	Cost per thousand.	Substituted in the place of—
Bateo, maria, ponulo, roble, espave.....	366,338	\$50.00	Fir and yellow pine. Poplar.
Aleavú.....	41,173	70.00	
First grade.....	4,575	55.00	
Caoba Blanca.....			Mahogany.
First grade.....	148,094	70.00	
Second grade.....	16,454	55.00	
Almendra, alcareto, amargo.....	819,683	85.00	Oak.
Cedro Amargo.....			
First grade.....	22,516	85.00	
Second grade.....	2,502	75.00	
Mangle Colorado.....	12,038	85.00	
Guayacon.....	23,405	110.00	
Nispero.....	1,027	110.00	
Grand total.....	1,457,805		

The economy of using native lumber can be determined by comparing the cost of native lumber shown above with the market value of standard woods. To the saving, due to the lower sale prices, the ocean freight from the United States on the entire quantity must be added. Also Isthmian freight from the Atlantic to the Pacific side is saved on, perhaps, 75 per cent of the total. The expense of handling is, of course, also lessened.

IMPROVEMENTS.

1. A light repair shop is being constructed adjacent to the commercial piers at Cristobal to facilitate repairs to ships at the piers. It is expected to have this shop in operation about October, 1920. The shop has a floor 75 feet by 110 feet and contains principally machine-shop tools. It is located in one end of a new concrete building, the other end being occupied by the supply department and steamship offices.

2. A reclaiming roll was installed in Balboa shops to reroll miscellaneous steel and iron scrap into round and rectangular section rods and bars.

3. A shed has been constructed near the Balboa roundhouse to house the wrecking crane.

4. An industrial railway has been constructed and is in use for conveying scrap wood from the wood shop to the boiler house, the cars being moved back and forth by hand.

5. Work is under way to roof over between buildings 2 and 3, Balboa, to permit rearrangement of the pipe shop which is badly congested.

6. A large horizontal boring mill was installed at Balboa.

7. Competitive examinations of applicants for apprenticeship were held.

NEEDS FOR THE COMING FISCAL YEAR.

1. The construction of new shops and dry-dock facilities at Cristobal. This has been recommended for several years and is a matter of much importance, as the present plant is inadequate and much out of date.

2. Provision of additional quarters at Balboa and Cristobal for both gold and silver employees.

3. The replacement of worn and obsolete tools, particularly at Cristobal, because of the delay in providing the new shops. Many tools are old French tools or those used during construction.

4. Enlargement of the gas plant for generation of oxygen and hydrogen to meet the demand.

5. Installation of proper facilities for heat treatment of large forgings.

STATISTICAL DATA.

The following statistical statements and plates accompany the report:

Table No. 1, abstract of expenditures.

Table No. 2, statement of overtime work performed, showing the per cent of the total pay roll.

Table No. 3, force report.

Table No. 4, statement of foundry outputs.

Table No. 5, expenditures and output of the oxy-acetylene plant.

Table No. 6, operation of Panama Canal dry docks.

Table No. 7, locomotive mileage and operating expenses, road service.

Table No. 8, locomotive engine days and operating expenses, yard service.

Table No. 9, car work, repairs by classes.

Table No. 10, railway shops, indirect expenses, direct labor, shop expense percentage, and transportation expenses on locomotives and cars.

Table No. 11, statement showing the power costs at Balboa shops.

Table No. 12, statement showing amount of general Canal overhead added to the cost of mechanical division work for outsiders.

Table No. 13, status as of June 30, 1920.

Plate No. 20, showing the classes of work and source of revenue.

Plate No. 21, showing the gross mechanical division overhead expense compared with the total direct labor charges.

Plate No. 22, showing comparatively the productive labor, overhead expense, supervision, maintenance, and power consumptions of marine shops.

Plate No. 23, showing the growth of work at Panama Canal repair wharves from 1916 to 1920, inclusive.

Respectfully submitted.

E. G. KINTNER,
Superintendent, Mechanical Division.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal, Balboa Heights, Canal Zone.

TABLE NO. 1.—Abstract of expenditures.

Month.	Labor.	Division overhead.	Machine.	Material.	Other expense.	Total.
BALBOA SHOPS.						
1919.						
July	\$182,476.20	\$54,623.75	\$12,913.55	\$155,485.68	\$103,832.99	\$509,337.17
August	217,319.15	54,101.20	14,355.77	138,014.69	50,587.97	474,378.78
September	204,253.52	57,056.07	13,089.68	142,769.51	57,549.79	474,718.57
October	199,623.89	47,443.86	13,189.69	158,731.43	41,190.20	460,179.07
November	184,677.96	47,326.71	11,424.18	139,397.18	38,296.66	441,122.69
December	206,005.27	64,101.10	12,235.25	151,162.73	39,783.24	473,287.59
1920.						
January	214,380.70	52,410.24	12,884.71	172,218.58	42,819.01	494,713.24
February	199,648.95	54,681.89	11,867.73	125,660.71	49,491.27	441,350.55
March	245,913.54	61,053.49	14,072.08	184,717.94	46,782.10	556,439.15
April	248,998.99	70,497.05	15,364.29	152,953.28	53,164.73	540,978.34
May	199,674.97	51,387.87	15,998.36	166,917.00	154,763.46	589,741.66
June	201,370.15	47,455.81	15,728.41	140,351.72	51,017.75	455,923.84
Total	2,504,343.29	665,144.04	164,023.70	1,848,380.45	729,279.17	5,911,170.65
Average per month this year ..	208,695.28	55,428.67	13,668.64	154,031.70	60,773.26	492,597.55
Average per month last year ..	205,345.37	.....	.....	144,946.16	32,216.81	382,508.34
CRISTOBAL SHOPS.						
1919.						
July	51,631.35	17,039.59	2,692.44	23,461.68	10,018.90	104,843.96
August	56,176.74	16,487.31	3,028.72	24,747.25	35,134.22	135,574.24
September	52,363.32	14,791.20	2,757.22	26,344.69	8,314.06	104,570.49
October	56,988.14	16,314.27	3,533.74	29,495.53	3,750.80	109,082.48
November	48,030.43	14,437.76	2,602.98	21,849.26	4,632.90	91,553.33
December	57,779.55	17,726.57	3,051.78	26,125.07	3,776.52	108,459.49
1920.						
January	65,294.85	20,746.74	3,457.16	24,823.57	9,638.14	123,960.46
February	63,962.11	20,417.90	2,937.71	28,679.10	23,558.79	139,555.61
March	73,336.59	23,086.22	2,723.25	30,196.59	9,637.35	138,980.00
April	74,302.99	22,868.73	2,874.17	33,349.94	25,516.52	158,912.35
May	66,631.05	19,370.67	3,017.14	26,999.62	22,380.71	138,399.19
June	65,973.32	18,094.84	3,240.10	23,916.57	373.11	111,597.94
Total	732,470.44	221,381.80	35,916.41	319,988.87	155,732.02	1,465,489.54
Average per month this year ..	61,039.20	18,448.48	2,993.04	26,665.74	12,977.67	122,124.13
Average per month last year ..	48,318.05	.....	.....	20,534.98	5,874.26	74,727.29
TOTAL.						
1919.						
July	234,107.55	71,668.34	15,605.99	178,947.36	113,851.89	614,181.13
August	273,495.89	70,588.51	17,384.49	162,761.94	85,722.19	609,953.02
September	256,616.84	71,847.27	15,846.90	169,114.20	65,863.85	579,289.06
October	256,612.03	63,758.13	16,723.43	188,226.96	43,941.00	569,261.55
November	232,708.39	61,764.47	14,027.16	181,246.44	42,929.56	532,676.02
December	263,784.82	81,827.67	15,287.03	177,287.80	43,559.76	581,747.08
1920.						
January	279,675.55	73,156.98	16,341.87	197,042.15	52,457.15	618,673.70
February	263,611.06	75,099.79	14,805.44	154,339.81	73,050.06	580,906.16
March	319,250.13	87,139.71	17,695.33	214,914.53	56,419.45	695,419.15
April	323,301.98	93,365.78	18,238.46	186,303.22	78,681.25	699,890.69
May	266,306.02	70,758.54	19,015.50	193,916.62	177,144.17	727,144.85
June	267,343.47	65,550.65	18,968.51	164,268.29	51,390.86	567,521.72
Total	3,236,813.73	886,525.84	199,940.11	2,168,369.32	885,011.19	7,376,660.19
Average per month this year ..	269,734.48	73,877.15	16,661.67	180,697.45	73,750.93	614,721.68
Average per month last year ..	253,663.42	.....	.....	165,481.14	38,091.06	457,235.62

¹ Includes charges, \$100,813.20, for work on the steamship *Culebra*, transferred from Cristobal to Balboa shop accounts.

TABLE NO. 2.—Statement of overtime work performed, showing the per cent of the total pay roll.

Month.	Balboa shops.		Cristobal shops.		Total.	
	Overtime.	Per cent of pay roll.	Overtime.	Per cent of pay roll.	Overtime.	Per cent of pay roll.
1919.						
July	\$29,165.06	12.81	\$6,385.71	10.31	\$35,550.77	11.20
August	32,807.58	14.13	5,900.33	9.71	38,707.91	12.03
September	18,934.50	8.72	7,033.39	12.30	25,967.89	8.54
October	7,999.38	3.74	6,501.61	10.73	14,500.99	4.78
November	15,078.72	7.99	6,133.72	11.94	21,212.44	7.90
December	14,637.89	6.63	6,380.07	10.26	21,017.96	6.72
1920.						
January	14,605.21	6.41	12,555.03	17.95	27,160.24	8.27
February	19,636.90	9.31	12,446.39	18.48	32,083.29	10.38
March	37,357.00	14.49	15,413.57	19.81	52,800.57	14.36
April	42,232.77	16.19	12,973.16	16.15	55,205.93	14.78
May	12,235.83	5.73	7,780.28	10.53	20,016.11	6.28
June	8,605.85	4.01	7,070.62	9.19	15,676.47	4.90
Total	253,986.69	.....	106,633.88	.....	360,620.57	.....
Average per month this year	21,165.56	9.18	8,886.16	13.11	30,051.71	9.18
Average per month last year	23,586.61	11.49	7,623.72	15.78	31,210.33	12.30

TABLE NO. 3.—Force report.

[Average number of men actually working.]

Month.	Balboa shops.			Cristobal shops.			Total.		
	Gold.	Silver.	Total.	Gold.	Silver.	Total.	Gold.	Silver.	Total.
1919.									
July	774	1,388	2,162	186	489	675	960	1,877	2,837
August	778	1,412	2,190	185	418	603	963	1,830	2,793
September	796	1,517	2,313	186	375	561	982	1,892	2,874
October	802	1,453	2,255	172	480	652	974	1,933	2,907
November	805	1,450	2,255	174	457	631	979	1,907	2,886
December	798	1,442	2,240	174	462	636	972	1,904	2,876
1920.									
January	845	1,490	2,335	189	458	647	1,034	1,948	2,982
February	761	1,415	2,176	198	480	678	959	1,895	2,854
March	884	1,329	2,213	218	457	675	1,102	1,786	2,888
April	905	1,372	2,277	211	580	791	1,116	1,952	3,068
May	755	1,337	2,092	215	471	686	970	1,808	2,778
June	806	1,264	2,070	202	411	613	1,008	1,675	2,683
Total	9,709	16,869	26,578	2,310	5,538	7,848	12,019	22,407	34,426
Average per month this year	809	1,406	2,215	193	461	654	1,002	1,867	2,869
Average per month last year	583	1,296	1,879	113	362	475	696	1,658	2,354

TABLE NO. 4.—*Statement of foundry outputs.*

Month.	Nonferrous.			Iron.		
	Patterns.	Castings.	Weight.	Patterns.	Castings.	Weight.
1919.						
July	42	1,060	19,308	71	3,417	143,370½
August	50	1,369	28,086½	52	2,335	130,226½
September	62	1,362	27,097½	64	2,663	117,173
October	39	955	15,985½	59	2,396	134,066½
November	40	1,221	27,961	58	2,961	98,276
December	43	4,443	13,356½	57	3,513	129,358
1920.						
January	67	2,837	24,720	46	3,055	95,914
February	48	2,357	21,533½	55	1,687	58,893
March	44	1,036	9,460	34	3,157	94,371
April	10	1,903	14,388	32	1,137	76,801½
May	18	1,370	11,759½	46	1,055	141,362
June	9	846	9,364½	30	1,208	64,581
Total	472	20,759	223,020	604	28,584	1,284,393
Average this year	39	1,730	18,585	50	2,382	107,033
Average last year	51	2,276	15,867	58	3,317	144,598

Month.	Steel.			Total.		
	Patterns.	Castings.	Weight.	Patterns.	Castings.	Weight.
1919.						
July	21	382	45,070	134	4,859	207,748½
August	18	334	34,860	120	4,038	193,173½
September	19	283	27,361	145	4,308	171,631½
October	19	590	24,093	117	3,941	174,145½
November	4	585	29,691	102	4,767	155,928
December	14	413	26,114	114	8,369	168,828½
1920.						
January	11	1,251	37,571	124	7,143	158,205
February	19	733	32,006	122	4,777	112,432½
March	50	1,383	55,439	128	5,576	159,270
April	12	1,151	48,683	54	4,191	139,872½
May	3	568	44,235	67	2,993	197,356½
June	5	266	55,382	44	2,320	129,327½
Total	195	7,939	460,505	1,271	57,282	1,967,918
Average this year	16	662	38,375	106	4,774	163,993
Average last year	11	632	32,861	121	6,225	193,326

TABLE NO. 5.—Expenditures and output of the oxy-acetylene plant, Balboa shops.

Month.	Total expenditures.	Oxygen output (cubic feet).	Acetylene output (cubic feet).	Hydrogen output (cubic feet).
1919.				
July.....	\$3,039.44	154,000	70,777	4,300
August.....	2,778.49	123,200	69,142	29,600
September.....	3,049.34	129,500	67,851	161,200
October.....	3,256.23	151,800	81,750	9,500
November.....	2,636.30	122,800	60,163	6,500
December.....	1,649.50	152,700	85,664	8,100
1920.				
January.....	1,668.26	154,700	89,477	58,400
February.....	2,729.31	137,625	67,564	4,900
March.....	3,143.49	161,375	84,822	3,700
April.....	3,334.29	148,800	89,058	77,100
May.....	3,576.81	151,450	80,183	286,700
June.....	3,393.71	140,500	82,676	196,300
Total.....	34,255.17	1,728,450	929,127	846,300
Average this year.....	2,854.60	144,038	77,427	70,525
Average last year.....	4,023.46	123,042	73,756	8,573

NOTE.—Although the total expenditures for this year are considerably less than for the preceding year, it will be noted that the output is materially greater. This is due to the manufacture of oxygen gas by the electrolytic instead of the chemical process.

TABLE NO. 6.—Operation of Panama Canal dry docks.

Month.	Balboa.					
	Operating expense.	Vessels docked.				
		Panama Canal.	War and Navy.		Commercial.	
		Number.	Number.	Tonnage.	Number.	Tonnage.
1919.						
July.....	\$9,190.35	.....	.....	.....	2	6,532
August.....	10,485.48	2	1	17,000	2	6,608
September.....	10,985.58	3	2	9,151	2	7,554
October.....	11,071.83	4	.....	.....	4	16,171
November.....	9,306.14	.....	.....	.....	2	19,581
December.....	9,654.08	.....	2	1,235	3	19,410
1920.						
January.....	10,334.32	4	4	1,940	3	4,283
February.....	9,694.36	.....	4	1,940	5	16,970
March.....	10,792.40	5	.....	.....	5	14,586
April.....	10,920.89	2	1	153	3	18,400
May.....	11,787.03	3	2	1,250	.....	.....
June.....	11,074.39	7	.....	.....	3	17,944
Total.....	125,296.85	30	16	32,669	34	148,039
Average per month this year.....	10,441.40	2+	1+	2,722	2+	12,337
Average per month last year.....	8,947.23	5—	1+	1,466	4+	21,077

TABLE NO. 6.—*Operation of Panama Canal dry docks—Continued.*

Month.	Cristobal.					
	Operating expense.	Vessels docked.				
		Panama Canal.	War and Navy.		Commercial.	
			Number.	Number.	Tonnage.	Number.	Tonnage.
1919.						
July.....	\$1,503.81	5	3	201	3	903
August.....	1,615.98	2	2	501	7	6,326
September.....	2,648.82	1	4	1,781	3	2,746
October.....	1,308.89	1	1	50	3	2,953
November.....	1,177.58				5	7,602
December.....	2,710.15	1			4	9,700
1920.						
January.....	1,272.27				1	2,605
February.....	1,643.07		3	686	4	4,010
March.....	1,418.94	4	3	670	2	2,363
April.....	1,414.89	1	3	1,542	3	3,630
May.....	3,321.61	4	2	108	4	3,992
June.....	6,533.99	1	1	505	4	3,367
Total.....	26,570.00	20	22	6,038	43	50,197
Average per month this year.....	2,214.17	2—	2—	503	4—	4,183
Average per month last year.....	2,102.47	4—	4+	574	3	3,158

¹ Variation due to maintenance work.TABLE NO. 7.—*Locomotive mileage and operating expenses, road service.*

Month.	Mileage.	Water (gallons).	Coal (pounds).	Fuel oil (gallons).
1919.				
July.....	28,309	4,330,708	623,680	244,574
August.....	28,097	3,666,096	790,920	246,292
September.....	25,157	4,441,936	778,340	245,936
October.....	24,744	3,870,286	616,860	252,472
November.....	24,340	3,472,979	614,280	229,773
December.....	29,216	3,526,520	792,400	277,464
1920.				
January.....	28,575	3,742,950	630,760	266,550
February.....	25,894	3,903,589	352,680	289,680
March.....	28,701	3,893,612	333,040	276,994
April.....	27,689	3,411,953	269,640	282,049
May.....	25,706	3,813,662	268,200	244,518
June.....	28,362	3,840,384	273,220	306,305
Total.....	325,790	45,944,675	6,344,020	3,162,446

Month.	Total lubricant cost.	Total hosting cost.	Repairs.			Grand total cost.	Cost per mile.
			Heavy.	l ight.	Total.		
1919.							
July.....	\$54.42	\$1,640.70	\$4,167.63	\$2,248.77	\$6,416.40	\$18,888.35	\$0.67
August.....	46.25	1,650.20	3,111.26	1,391.10	4,502.36	17,830.47	.64
September.....	48.94	1,720.35	2,584.17	478.33	3,062.50	16,473.04	.66
October.....	47.81	1,642.57	823.32	3,316.46	4,139.78	16,513.46	.67
November.....	44.01	1,683.91	610.37	2,168.15	2,778.52	14,723.67	.61
December.....	48.84	1,709.29	801.59	1,350.13	2,151.72	16,514.72	.57
1920.							
January.....	49.81	1,756.92	601.25	1,052.99	1,654.24	14,981.85	.53
February.....	49.25	1,770.92	920.27	1,127.21	2,047.48	14,797.64	.65
March.....	53.55	1,652.26	1,358.83	2,757.71	4,116.54	16,265.94	.56
April.....	54.95	1,654.33	3,593.49	2,017.41	5,610.90	17,617.09	.64
May.....	59.67	1,867.83	1,648.30	2,438.08	4,086.38	17,281.20	.67
June.....	50.10	1,659.25	4,579.00	2,601.94	7,181.94	19,962.72	.68
Total.....	607.60	20,409.53	24,799.48	22,903.28	47,702.76	201,850.15	.62

TABLE NO. 8.—*Locomotive engine days and operating expenses, yard service.*

Month.	Engine days.	Water (gallons).	Coal (pounds).	Fuel oil (gallons).
1919.				
July.....	525	2,472,292	1,353,440	38,602
August.....	586	2,185,654	1,791,220	28,774
September.....	585	2,555,414	1,428,840	43,777
October.....	613	2,303,214	1,677,760	39,859
November.....	479	2,003,271	1,243,740	49,503
December.....	569	1,951,230	1,550,900	46,896
1920.				
January.....	552	2,067,550	1,363,400	48,270
February.....	525	1,790,411	1,021,440	60,262
March.....	605	2,026,638	1,403,580	69,633
April.....	537	2,021,997	847,620	64,726
May.....	529	2,104,838	1,735,480	74,044
June.....	591	2,037,616	1,035,280	81,498
Total.....	6,696	25,520,125	16,452,700	645,844

Month.	Total lubricant cost.	Total hosting cost.	Repairs.			Grand total cost.	Cost per day.
			Heavy.	Light.	Total.		
1919.							
July.....	\$48.63	\$1,185.39	\$2,941.88	\$5,106.18	\$8,048.06	\$16,896.68	\$32.18
August.....	62.89	1,650.20	3,811.60	5,710.49	9,522.09	19,930.99	34.02
September.....	57.77	1,226.49	4,715.11	6,975.99	11,691.10	21,100.16	36.07
October.....	57.92	1,118.98	7,975.39	5,448.10	13,423.49	23,295.36	38.00
November.....	49.49	1,263.34	4,773.10	6,080.54	10,853.64	19,581.01	40.88
December.....	63.24	1,249.04	5,749.59	5,433.82	11,183.41	20,931.41	36.61
1920.							
January.....	62.52	1,202.15	7,032.80	5,854.22	12,887.02	22,306.99	40.23
February.....	47.84	1,276.23	4,080.06	3,281.93	7,361.99	15,433.75	29.40
March.....	49.01	1,211.16	3,372.29	5,302.31	8,674.60	18,727.40	30.95
April.....	56.70	1,288.05	4,804.13	5,325.31	10,129.44	17,545.77	32.70
May.....	58.97	1,351.25	8,508.54	7,205.01	15,713.55	21,596.49	40.83
June.....	64.95	1,099.72	8,326.34	7,059.09	15,385.43	24,014.53	40.63
Total.....	679.93	15,122.00	66,090.83	68,762.99	134,853.82	241,261.03	36.03

TABLE NO. 9.—*Car-work repair by classes.*

Class.	Heavy.	Light.	Class.	Heavy.	Light.
Passenger.....	41	42	Refrigerator.....	36	43
Box.....	94	604	Stock.....	14	16
Caboose.....	10	38	Rodger ballast.....	14	16
Coal.....	36	46	Labor.....	1	143
Steel dump.....	168	362	Wrecking.....	5	.....
40-ton flats.....	24	103	United States Army labor....	2	593
50-ton flats.....	83	306			
Oil tank.....	.....	3	Total.....	528	2,315

TABLE NO. 10.—*Railway shops.*

	Maintenance-of-equipment shop expenses.			Transportation expenses.
	Indirect expenses.	Direct labor.	Shop expense (per cent).	
Roundhouses:				
Balboa.....	\$26,560.24	\$55,809.72	47.60	¹ \$25,986.08
Cristobal.....	11,084.92	20,974.13	52.85	¹ 14,541.32
Car department.....	58,364.40	206,758.14	28.22	² 29,162.86

¹ Engine-house expenses.² Train supplies and expenses.

TABLE NO. 11.—*Power cost, Balboa shops.*

Month.	Steam.	Oil. ¹	Electricity.	Air.	Water.	Total.
1919.						
July.....	\$1,505.38	\$18,074.64	\$4,876.85	\$2,431.89	\$1,980.11	\$28,868.87
August.....	1,552.12	16,738.08	6,222.74	4,231.96	2,197.22	30,942.12
September.....	1,642.42	16,422.61	7,050.36	4,663.22	1,968.85	31,747.46
October.....	1,791.20	11,337.98	6,925.53	4,157.95	2,277.04	26,489.70
November.....	1,451.14	9,079.09	5,322.08	4,326.56	2,165.72	32,344.59
December.....	1,287.83	10,420.15	6,120.09	3,853.96	2,094.64	23,776.67
1920.						
January.....	1,303.69	10,322.96	5,233.86	4,104.51	1,798.96	22,763.98
February.....	1,431.20	11,560.39	4,448.30	574.13	2,773.63	20,787.65
March.....	1,395.60	11,474.57	5,678.22	3,903.88	3,079.28	24,531.55
April.....	1,373.39	11,503.37	8,042.97	4,875.20	2,827.74	28,622.67
May.....	1,181.99	12,630.81	8,916.32	5,447.34	1,559.81	29,736.27
June.....	1,248.80	12,907.44	8,683.10	5,565.83	1,499.87	29,905.04
Total.....	17,164.76	152,472.09	77,520.42	47,136.43	26,222.87	320,516.57
Average per month this year...	1,430.39	² 12,706.01	6,460.04	3,928.04	2,185.24	26,709.72
Average per month last year...	1,571.71	17,622.79	4,512.65	3,635.06	2,293.43	29,635.64

¹ Includes entire consumption of Panama R. R. locomotives.² Reduction due to lesser purchase prices.TABLE NO. 12.—*Statement showing the amount of general Canal overhead added to the cost of mechanical division work for outsiders.*

Month.	Shopwork.			Dry dock.			Total general Canal overhead applied.
	Division charges.	Amounts billed.	Balance general Canal overhead.	Division charges.	Amounts billed.	Balance general Canal overhead.	
1919.							
Balboa:							
July.....	\$25,802.60	\$28,530.34	\$2,727.74	\$9,051.60	\$8,344.00	\$707.60	\$2,020.14
August.....	352,785.91	388,602.30	35,816.39	10,001.73	39,034.15	29,032.42	64,848.81
September.....	108,929.60	120,146.21	11,216.61	10,583.08	6,460.75	4,122.33	7,094.28
October.....	259,236.97	285,686.29	26,449.32	10,678.08	7,961.20	2,716.88	23,732.44
November.....	354,051.26	389,628.47	35,577.21	8,226.14	16,327.35	8,101.21	43,678.42
December.....	197,985.26	218,182.06	20,196.80	9,609.08	12,853.27	3,244.19	23,440.99
1920.							
January.....	212,322.40	229,020.11	16,697.71	8,324.32	6,462.19	1,862.13	14,835.58
February.....	159,494.15	180,545.77	21,051.62	9,434.36	21,992.05	12,557.69	33,609.31
March.....	395,566.73	435,353.18	39,786.45	8,967.90	5,685.40	3,282.50	36,503.95
April.....	107,547.67	118,567.13	11,019.46	9,204.39	10,293.09	1,088.70	12,108.16
May.....	69,550.09	77,366.76	7,816.67	9,210.03	1,119.65	10,329.68	2,513.01
June.....	234,254.63	258,088.24	23,833.61	7,532.39	7,153.85	378.54	23,455.07
Total.....	2,477,527.27	2,729,716.86	252,189.59	110,823.10	141,447.65	30,624.55	282,814.14
1919.							
Cristobal:							
July.....	31,187.97	34,314.29	3,126.32	978.81	1,431.30	452.49	3,578.81
August.....	133,676.09	147,037.80	13,361.71	1,280.98	2,000.35	719.37	14,081.08
September.....	52,267.86	57,537.37	5,269.51	2,278.82	1,674.95	603.87	4,665.64
October.....	68,457.37	75,315.24	6,857.87	1,233.89	1,623.55	389.66	7,247.53
November.....	46,855.61	51,589.14	4,733.53	1,177.58	3,564.70	2,387.12	7,120.65
December.....	75,926.00	83,568.78	7,642.78	2,635.15	5,065.15	2,430.00	10,072.78
1920.							
January.....	128,841.56	141,732.73	12,891.17	1,272.27	3,419.75	2,147.48	15,038.65
February.....	42,912.87	47,241.01	4,328.14	1,643.07	4,324.55	2,681.48	7,009.62
March.....	51,079.48	56,187.48	5,108.00	993.94	2,564.25	1,570.31	6,678.31
April.....	99,223.22	109,301.62	10,078.40	1,282.89	3,480.05	2,197.16	12,275.56
May.....	51,819.01	60,510.05	8,691.04	2,670.61	1,949.60	721.01	7,970.03
June.....	102,458.75	112,691.01	10,232.26	6,358.49	2,026.20	4,332.29	5,899.97
Total.....	884,705.79	977,026.52	92,320.73	23,806.50	33,124.40	9,317.90	101,638.63
Grand total.....	3,362,233.06	3,706,743.38	344,510.32	134,629.60	174,572.05	39,942.45	384,452.77

NOTE.—Figures in heavy-face type denote deficit.

TABLE NO. 13.—*Mechanical division, fiscal year 1919-20.*

Status as of June 30, 1920:

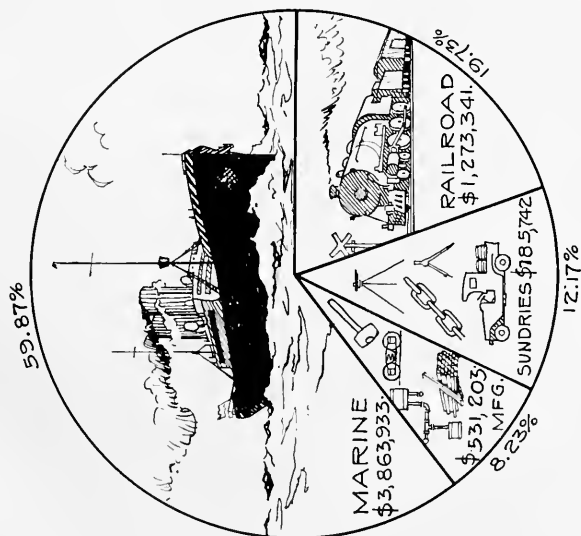
Overhead expense:		Credit.
Balboa.....	\$47,832.50	
Cristobal.....	43,525.81	
		\$91,378.34
Reserves:		
Repairs to machinery.....	9,367.43	
Repairs to buildings.....	¹ 3,575.94	
Repairs to structures.....	4,740.90	
Gratuity (accrued leave and holiday time).....	239,300.08	
		239,832.47
Depreciation:		
Cranes.....	2,182.22	
Autos.....	336.93	
Dry dock.....	30,000.00	
		² 32,519.15
Stock on hand.....		32,920.54
Work in progress:		
Balboa.....	548,357.27	
Cristobal.....	237,732.26	
		786,089.53
Total.....		1,182,740.03

¹ Debit. Temporary condition due to the scaling and painting of the structural steel in the shop buildings during May and June.

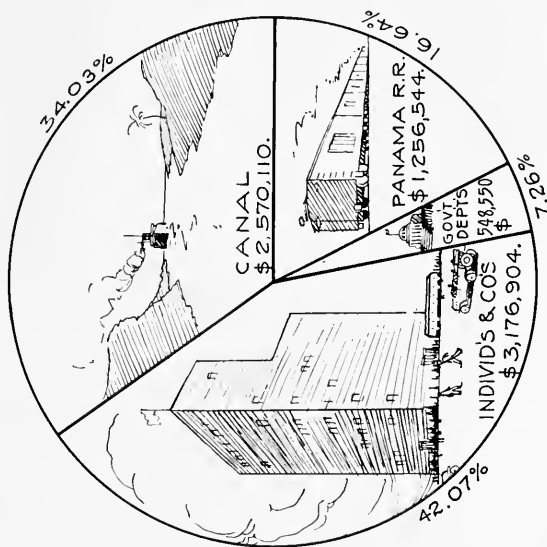
² The total amount of depreciation set aside for the Balboa dry dock since the account was established, July, 1917, is \$90,000.



CHARTS SHOWING CLASSES OF WORK & SOURCE OF REVENUE



CLASSES OF WORK

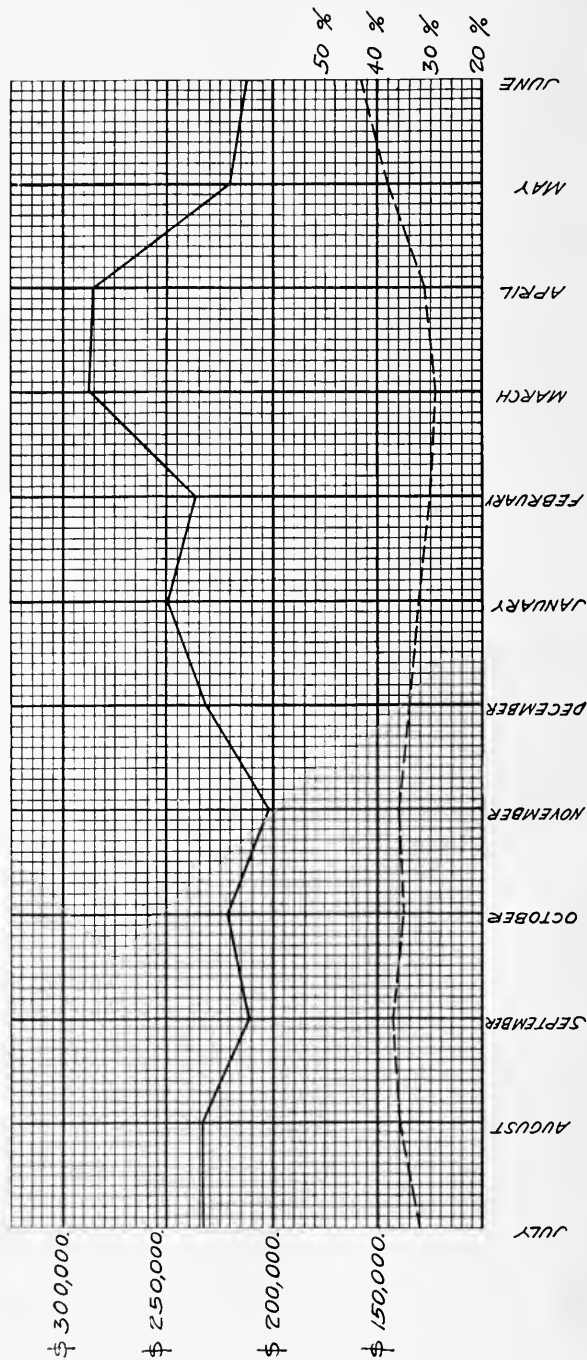


SOURCE OF REVENUE

MECHANICAL DIVISION GROSS OVERHEAD EXPENSE PERCENTAGE
 COMPARED WITH THE TOTAL DIRECT LABOR CHARGES
 FISCAL YEAR 1919-1920

Plate 21.

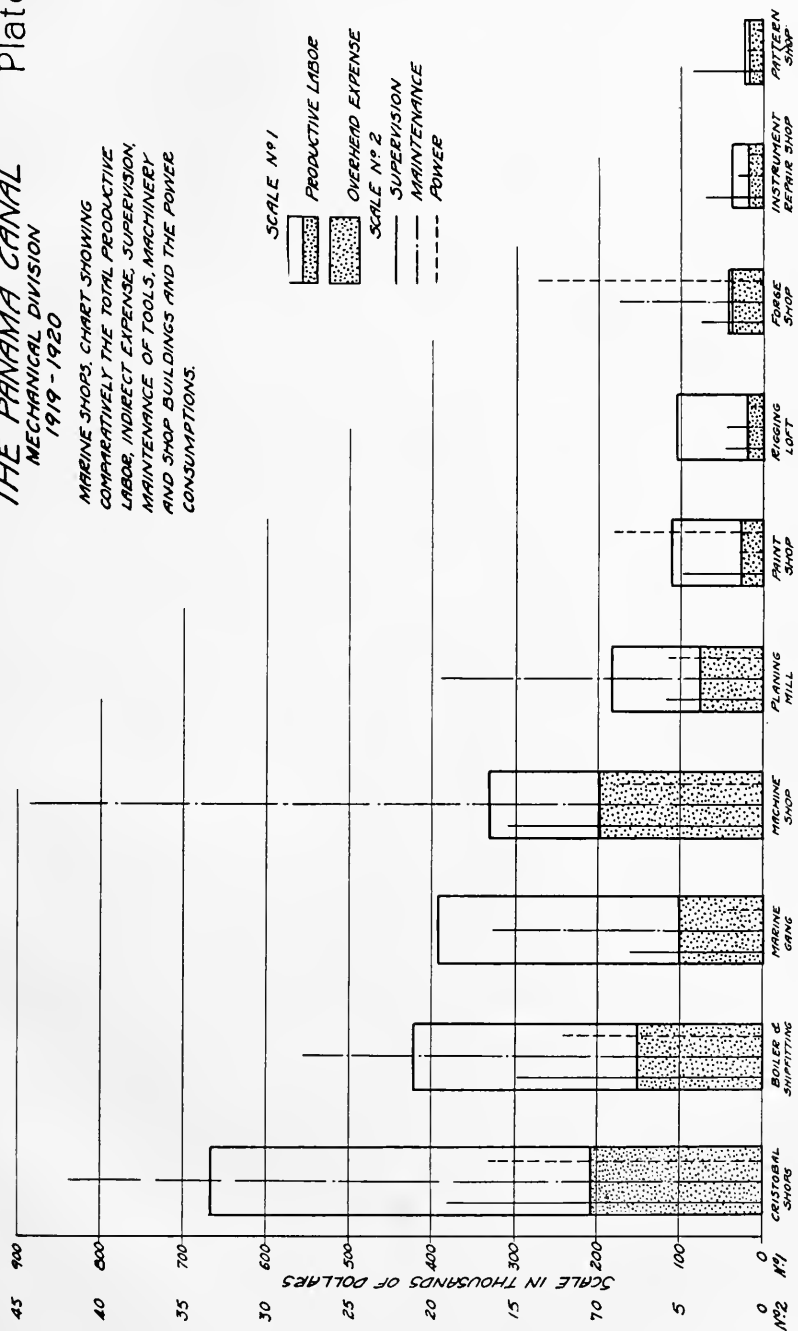
— PRODUCTIVE LABOR DOLLARS
 --- OVERHEAD EXPENSE PERCENT



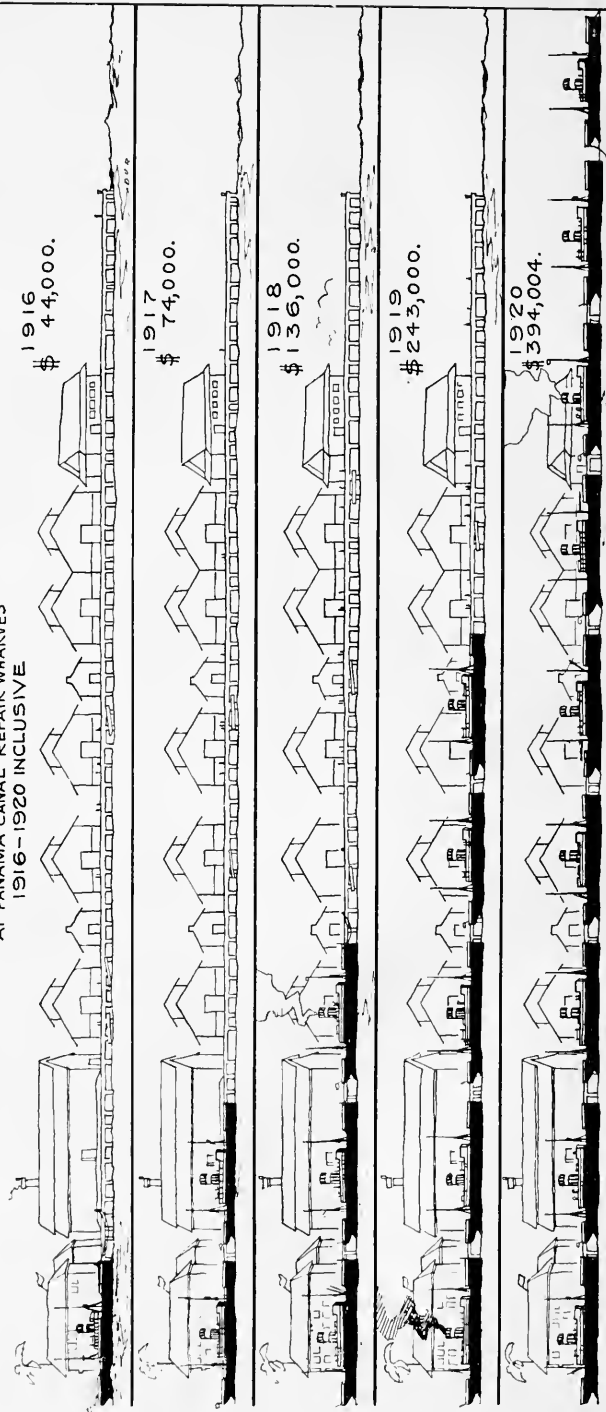
THE PANAMA CANAL MECHANICAL DIVISION 1919 - 1920

Plate 22.

MACHINE SHOPS, CHART SHOWING
COMPARATIVELY THE TOTAL PRODUCTIVE
LABOR, INDIRECT EXPENSE, SUPERVISION,
MAINTENANCE OF TOOLS, MACHINERY
AND SHOP BUILDINGS AND THE POWER
CONSUMPTIONS.



THE PANAMA CANAL
MECHANICAL DIVISION
CHART SHOWING THE
GROWTH OF WORK
AT PANAMA CANAL REPAIR WHARVES
1916-1920 INCLUSIVE



NOTE: THE ABOVE FIGURES COVER ONLY THE WORK OF THE MARINE GANG, SHOP T. FOR THE TOTAL DIVISION EXPENDITURES, SEE TABLE NO. 1

APPENDIX D.

REPORT OF THE CHIEF QUARTERMASTER, SUPPLY DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *July 30, 1920.*

SIR: I have the honor to submit the following report covering the operations of the supply department for the fiscal year ended June 30, 1920:

ORGANIZATION.

The organization of the department continued substantially the same as outlined in the annual report of June 30, 1919.

PERSONNEL.

There has been no material change in the personnel. Mr. R. K. Morris continued as chief quartermaster; Mr. Roy R. Watson as superintendent; Mr. J. J. Jackson as general manager, commissary division; Mr. W. B. Brown as superintendent, cattle industry division; and Mr. M. D. Smith as general storekeeper.

LABOR.

In June, 1919, the silver force was 17,071 and the gold force 3,290, or a total of 20,361. In June, 1920, the force consisted of 17,023 silver employees and 4,608 gold employees, or a total of 21,631 actually working. This increase of 1,318 gold employees is partially due to the employment of a number of gold employees to replace silver employees at the time of the strike, and also the employment of gold skilled help in the building and mechanical divisions. There will probably be a material reduction in both gold and silver forces within the next few months.

There was considerable labor unrest during the year which culminated in a general strike of the silver employees on February 24.

During the year adjustments in silver rates of pay were made on July 1, 1919, and February 1, 1920. A further adjustment was made on July 1, 1920. In each case such adjustments were based on the increased cost of living.

The number of silver employees on the rolls each month throughout the year was as follows:

July.....	18, 185	January.....	18, 214
August.....	17, 690	February.....	18, 231
September.....	18, 219	March.....	16, 700
October.....	16, 432	April.....	17, 754
November.....	16, 243	May.....	17, 074
December.....	18, 123	June.....	17, 023

This shows a fluctuation between the maximum and minimum number of men on the rolls of 1,988 men, or 11 per cent, based on the average number of men employed throughout the year.

QUARTERS.

Applications on file for family quarters for gold employees on June 30, 1919, were 306, as compared with 618 on June 30, 1920. The quarters situation has been considerably congested, occasioned partly by the number of men returning from military service, all of whom were placed at the head of the list for assignment to first quarters available of the class to which they were entitled when they entered the service of the Army or Navy.

The number of applications on file for silver family quarters on June 30, 1920, were as follows:

D. Q. M., Balboa Heights.....	44
D. Q. M., Pedro Miguel.....	7
D. Q. M., Gatun.....	6
D. Q. M., Cristobal.....	690
Total.....	747

The following buildings were transferred from Las Cascadas to other districts for use of gold employees as quarters:

- 7 type 15's to Pedro Miguel for use of 7 families.
- 3 type 7's to Pedro Miguel for use of 4 families.
- 3 type 7's to Cristobal for use of 6 families.
- 2 type 7's to Gatun for use of 2 families.
- 1 type 16 converted into bachelor quarters and moved to Balboa (building located near coaling plant for use of operators).

One quarantine detention building at Balboa no longer needed by the health department was converted into eight apartments for gold employees' families. Six ward buildings formerly a part of Ancon Hospital were converted into 22 sets of quarters for gold employees' families.

Thirty-nine 12-family houses and ten 32-room bachelor houses have been authorized by the Panama Railroad Company for use of dock and coaling plant laborers at Cristobal. The usual rent of \$5 per month per family and \$2 per bachelor will be charged to employees occupying these quarters. Twenty-four families were assigned during the month of June to two of the houses which were all of the lot that had been completed during the year.

A building located in the Panama Railroad yards, Panama, formerly used to house two families of gold employees was converted into a six-apartment house for silver employees, as it was considered that the location and construction of the building made it undesirable for continued use to house families of gold employees.

Camp Otis, village of Las Cascadas, which had been abandoned by the Army, was turned back to the Canal in October, 1919. Some of the better buildings were removed to other districts and recreated for use of gold employees, the remainder being left for the purpose of providing homes for silver employees who were temporarily out of work and where they could support themselves and families at a nominal expense and would not be subject to the general rules in regard to vacating quarters when employment is terminated, should

they be employed temporarily while living in this settlement. The village suits this project very well, as it is not in close proximity to active units of the Canal and therefore does not interfere with them. West Indian families are permitted to rent a set of quarters at a rate of \$2.50 per month, with 50 cents additional for each hectare of land which they desire for gardening, poultry raising, and growing of fruit trees. The colony was started in November, 1919, and at the end of June, 1920, there were 40 families who had taken advantage of the opportunity to have a home at a nominal cost.

Twenty-six garage stalls were built at Balboa, 10 at Cristobal, and 8 at Pedro Miguel from funds appropriated for this purpose during the fiscal year ending June 30, 1919.

ZONE SANITATION.

Garbage collection for the Canal Zone has been carried on by the supply department in all districts except Cristobal and Army and Navy reservations. Incinerators were operated at Pedro Miguel and Gatun by the supply department but were handled by the health department at Cristobal and the municipal engineering division at Balboa. The cost of handling garbage for the fiscal year ending June 30, 1920, was \$28,606.38, as compared with \$20,935.13 for the previous year.

MOTOR TRANSPORTATION.

Additional Ford trucks were purchased during the year to meet the requirements of the various divisions in handling material. The supply department has operated the greater part of all the motor transportation for the Canal, exceptions being with cars driven by repair mechanics, where complete repair kits and small quantities of repair material are kept aboard the cars for emergency use, such as electrical and telephone material, and where lockmen and coaling plant and oil plant men have to be transported quickly to their work to handle ships.

Vehicles on hand and operated by all departments.

	1919	1920
Ford cars, $\frac{1}{2}$ -ton delivery	78	57
1-ton trucks	47	78
1 $\frac{1}{2}$ -ton trucks	7	7
3 $\frac{1}{2}$ -ton trucks	15	15
2 $\frac{1}{2}$ -ton trucks (electric)	3	3
2-ton trucks		4
Ford passenger cars	11	16
Combination passenger and delivery, changeable	4	17
Hearse	1	2
Ambulance	7	8
Motorcycles	56	58
Bus, 1 $\frac{1}{2}$ -ton		1

The above transportation is used by the commissary, electrical, quartermaster, hospital, post office, and mechanical divisions; police and fire division not included. Reduction in one-half ton delivery cars accounted for by conversion to combination, 12; to passenger, 5; condemned, 1; and to trucks, 2.

ANIMAL TRANSPORTATION.

Animal transportation has been further reduced and replaced by motor transportation. The animals that are still in service are used for drawing mowing machines, garbage wagons, and material wagons where roads do not permit the use of motor trucks.

Animals.

	Horses.	Mules.
Number on hand July 1, 1919.....	39	194
Received during year.....		3
Sold or surveyed.....	6	17
Transferred to other departments and cattle industry.....	4	37
On hand June 30, 1920.....	29	143

Cattle industry.

	Horses.	Mules.
On hand July 1, 1919.....	190	137
Received during year.....	46	...
Sold and surveyed.....	26	25
Transferred to other departments.....	2	2
On hand June 30, 1920.....	208	110

MATERIAL AND SUPPLIES.

A total of 881 requisitions was prepared and forwarded to the general purchasing officer, as compared with 898 during the preceding year. The total value of material received during the fiscal year was \$7,812,258.86, as compared with \$7,832,845.61 for the preceding fiscal year. The local purchases amounted to \$1,650,271.25, as compared with \$1,452,153.35 for the fiscal year ending June 30, 1919. Material consigned to The Panama Canal came forward in 208 steamers.

On June 30, 1920, the value of material in stock was \$5,249,300.15, as against \$6,001,451.24 on June 30, 1919, not including the value of obsolete material and scrap. The following statement shows material on hand at beginning and end of year and total of all issues from the different storehouses for 1919 and 1920, exclusive of obsolete material and scrap:

	General storehouse.	Cristobal storehouse.	Paraiso storehouse.	Total.
On hand June 30, 1919.....	\$4,332,763.70	\$749,228.87	\$919,458.67	\$6,001,451.24
On hand June 30, 1920.....	3,765,999.30	828,331.64	654,969.21	5,249,300.15
Issued 1918-19.....	9,479,634.02	2,078,800.88	598,655.34	12,157,090.24
Issued 1919-20.....	8,379,984.19	2,839,380.58	746,944.04	11,966,308.81

SALES.

Table No. 3 attached covers total of all classes of sales for the year, showing 95,683 sales, amounting to \$3,025,398.18. Sales to steamships show an increase of \$97,039.85, and 3,265 vessels were handled, as compared to 2,156 for the fiscal year ending June 30, 1919.

During the year a total of 248,294 requisitions and foreman's orders was handled, distributed as follows:

General storehouse.....	156,415
Cristobal storehouse.....	76,243
Paraiso storehouse.....	15,636

The consumption of cement for the year was 158,089 barrels.

SURPLUS, OBSOLETE, AND SCRAP MATERIAL AND EQUIPMENT.

The Mount Hope obsolete storehouse, under supervision of the storekeeper, Cristobal, was operated as during previous years as a concentration point for obsolete and surplus material. Iron and steel scrap operations were continued at the Mount Hope scrap yard; all other scrap operations, including miscellaneous metals, being transferred to the general storehouse at Balboa, in connection with which there was erected a building to properly house such operations, including the reclaiming of material for return to stock.

During the year two scrap shears were purchased and installed at the Mount Hope scrap yard for the purpose of facilitating the cutting and classifying of scrap to conform to Panama Canal scrap classification effective July 1, 1920, with the end in view of securing more favorable prices for Panama Canal scrap. Results to date have been very satisfactory. It is anticipated that all scrap now on hand will be cut up, classified, and sold by December 1, 1920, at which time it is intended to transfer the two scrap shears from Mount Hope to the general storehouse, Balboa, where a modern scrap dock was constructed during the year, and where all future scrap operations will be handled.

During the year 20,378 tons American scrap were sold; 13,981 tons at San Francisco, 593 tons at New York, and 5,804 tons in Italy.

Table No. 10 attached indicates status of obsolete and surplus material at the beginning and end of the fiscal year, the receipts and issues during this period, and the balance on hand June 30, 1920.

Table No. 11 herewith shows American scrap operations during the fiscal year.

The French scrap situation is as follows:

	Tonnage.	Price.	Amount.
On hand June 30, 1919.....	9,429.85	\$5.65	\$53,278.65
Received during year 1919-20.....	None.		
Shipped on Rovetta contract, 1919-20.....	9.59	5.65	54.17
Balance on hand June 30, 1920.....	9,420.26	5.65	53,224.48

Table No. 5 attached gives details of sales from the obsolete and general storehouse of surplus, obsolete, and scrap material, equipment, and supplies, the original cost of which was over \$500, to be reported to the Secretary of War.

FUEL-OIL PLANTS.

Operation of the Balboa and Mount Hope fuel-oil plants continued under the supervision of the general storekeeper during the fiscal year.

Contract to furnish fuel oil was entered into with the West India Oil Co. for 300,000 barrels, at \$1.12 per barrel, delivered into Panama Canal tanks at Mount Hope; and 700,000 barrels, at \$1.29 per barrel, delivered into Panama Canal tanks at Balboa. This contract expired June 30, 1920, but was subject to renewal to December 31, 1920, which option was exercised in view of favorable price covering same.

Construction of two 55,000 barrel capacity concrete tanks, one at Balboa and one at Mount Hope, was started during the year and was 90 per cent complete on June 30, 1920.

Table No. 12 attached indicates total fuel oil handled by the Balboa and Mount Hope fuel-oil plants, in amount 5,620,986 barrels, for 1,195 vessels, including both receipts and issues.

GASOLINE STORAGE.

Storage of bulk gasoline at Balboa and Mount Hope continued during the year, although none was received, due to difficulty in arranging delivery of this commodity in bulk, except that 484,045 gallons were purchased in containers from the salvaged cargo of the steamship *Olockson*. On account of the deteriorated condition of the containers it was necessary to place this gasoline in tank storage.

PANAMA CANAL PRESS.

The value of the output of the printing plant was \$158,406.79, an increase of \$10,779.36 over the preceding year. The value of the output of the stationery section was \$203,106.71, an increase of \$45,610.53 over the fiscal year ending June 30, 1919. The combined business of both sections was \$361,513.50, an increase of \$56,389.89 over the preceding year.

The most important feature of the year's work was the installation of the commissary coupon section for the printing of commissary books, which is now in satisfactory working order. It is estimated that this addition will effect a saving of approximately \$30,000 annually over United States contract prices.

The value of stock on hand at the close of the year was \$109,605.55, as compared with \$98,103.52 for the preceding fiscal year. This increase was occasioned by the additional stock required in connection with printing commissary coupon books.

The total value of material issued was \$158,406.79, as compared with \$147,627.39 for the preceding year. This increase was due to the printing of a standard stock catalogue, foremen's order books, of which only a small supply was left over from the last fiscal year, as well as folders for the Washington and Tivoli Hotels.

The total value of material used in manufacture was \$70,022.28, as compared with \$63,634.43 for the fiscal year ending June 30, 1919.

The following table shows the principal items of manufacture:

Forms.....	32,223,234	Pads, desk.....	100
Books, coupon.....	715,000	Pads, scratch.....	105,561
Pamphlets, etc.....	153,472	Sheets, ruled.....	148,100
Sheets, carbon.....	203,700	Tags, assorted.....	1,405,450
Time tables.....	1,600	Canal Records.....	467,500
Cards, guide, etc.....	361,716	Binders.....	2,493
Stamps and daters.....	2,968	Programs.....	35,543
Cardboard.....	137,391	Folders.....	139,875
Paper, sheets.....	3,570,199	Envelopes.....	416,387
Paper, rolls (pounds).....	222,065		

SUBSISTENCE.

Mr. Roy R. Watson, superintendent of the supply department, remained in charge of the subsistence branch, assisted by an inspector.

On June 30, 1920, the department operated the hotels Tivoli and Washington on the mainland, the Hotel Aspinwall on Taboga Island, three cafeterias, four popular-priced restaurants, and two lunch rooms for the gold employees. Three labor messes were operated for the silver employees.

The hotels Tivoli and Washington were operated on the European plan and the Hotel Aspinwall on the American plan. Owing to popular demand among the patrons, the Ancon restaurant was transformed into a cafeteria with a combination of à la carte service. The Hotel Washington is owned and financially operated by the Panama Railroad Company under the management of the supply department.

The total amount of salaries and wages for the fiscal year was \$156,151.23, an increase of \$32,296.49, making the proportion of net pay roll to revenue 18.31 per cent, an increase of 1.82 per cent above last year. The increase in pay roll is accounted for by the higher rates of salaries established during the year for both gold and silver employees.

The line restaurants and cafeterias showed a net loss of \$4,758.84 and the labor messes a profit of \$5,516.57. The Hotel Tivoli showed a net profit of \$15,763.47; the Hotel Washington was operated at a net gain of \$24,046.01.

An increase of revenue is noted in the hotels Washington and Tivoli. This increase is due to resumption of travel of the general public since the restrictions caused by the war have been removed.

COMMISSARY DIVISION.

The commissary division remained in charge of Mr. J. J. Jackson, general manager. There was an increase in the business of the commissary division as a whole. In the wholesale manufacturing plants there was a decrease of approximately \$780,000. This decrease was due to the decrease in the personnel of the Army and Navy on the Isthmus.

The bakery, coffee-roasting plant, Cristobal laundry, ice plant, milk-bottling plant, and industrial laboratory show an increase in the volume of business over the fiscal year 1919; and the abattoir, ice-cream plant, sausage factory, pickling department, and the Ancon laundry show a decrease. The increase in the Cristobal laundry is due to a steadily increasing steamship business. The increase in the milk-bottling plant is due to the increased production of the local dairy.

While fewer cattle were slaughtered in the abattoir than in 1919, the local consumption was somewhat larger, the decrease being due to the temporary suspension of beef shipments to the Army in the United States.

Due to the purchasing of Colombian beef on large contracts, the retail prices of beef were kept at approximately the same figures as for the fiscal year 1919.

General market conditions throughout the year have been practically unparalleled, and it has been extremely difficult to secure and

maintain an adequate supply of all commodities. It has been the general policy of the commissary division to hold purchases as low as possible in order that they would not have a large stock of merchandise on hand in case a material reduction in prices took place. This policy has resulted in a reduction of stock on hand and a reduction in investment in commissary stocks.

On account of the market conditions it was found necessary to send a representative of the commissary division to New York to cooperate with the purchasing agent, and as a result very favorable purchases in dry goods were made by taking advantage of spot purchases in the New York market. On account of the general market conditions and the policy adopted, no very large purchases were made.

The commissary division was probably more seriously inconvenienced by the strike of silver employees than any other branch of the Canal activities. Advance information was obtained that the strike would probably be called and every precaution possible was taken in the way of shipping large stocks to line commissaries from the wholesale units. As a result there was an ample supply of all non-perishable goods on hand at all commissaries when the strike was called. Silver employees were replaced by gold employees who volunteered from other departments and the plants were kept in operation without serious inconvenience.

COSTA RICAN AGENCY.

On account of unsatisfactory transportation it was decided to close this agency the latter part of 1919. Necessary notice was furnished the planters before the agency was closed. In view of improved transportation facilities within the past few months it has been decided to reopen this agency, but to confine purchases to vegetables and fruits which could stand shipment, such as oranges, potatoes, etc. The Costa Rican market also offers at times very favorable opportunities for the purchase of sugar and coffee.

CHANGES, ALTERATIONS, AND IMPROVEMENTS IN RETAIL COMMISSARIES.

Tanks for storing kerosene in bulk were installed in the Ancon market and Ancon, Balboa, La Boca, Pedro Miguel, Red Tank, Gatun, and Cristobal commissaries.

A new electric freight elevator was installed in Gatun commissary, and at the Pedro Miguel commissary the ice box was remodeled and equipped with a small mechanical refrigerating machine.

The two-story building which is to house the new Mount Hope commissary is practically completed. It is of frame construction, 120 by 66 feet 6 inches, and will have 38 retail sections and be equipped with an electric freight elevator, a 6,000-gallon kerosene oil tank, and cold-storage department cooled by mechanical refrigeration. When this store is placed in operation it will handle the business now transacted by Camp Bierd commissary and eventually the silver trade, which is now being taken care of at the Cristobal commissary.

Large sales of commissary supplies were made to naval and Army transports during the last fiscal year, approximately \$37,000 worth of foodstuffs and commissary supplies being sold to the Pacific Fleet

in July, 1919. The U. S. A. T. *Mount Vernon* took \$53,661.28 worth of supplies during her stay at the port of Cristobal, from May 25 to June 5.

PRODUCTS SHIPPED TO THE UNITED STATES.

Shipments of various products, exclusive of beef, to the United States during the fiscal year were as follows:

Steer hides, pounds.....	1,574,735	Horn piths, pounds.....	1,869
Oleo oil, pounds.....	127,736	Switch hair, pounds.....	1,618
Oleo stearine, pounds.....	104,116	Hides, mule, each.....	26
Inedible grease, pounds.....	588,559	Hides, horse, each.....	33
Dried blood, pounds.....	141,595	Skins, calf, each.....	583
Cocoa, pounds.....	12,839	Neatsfoot oil, gallons.....	311
Dried tankage, pounds.....	193,796	Middles, beef, set.....	3,780
Horns, pounds.....	51,006	Wearands, beef, each.....	5,070
Hoofs, pounds.....	32,235	Bladders, each.....	5,576
Bones, pounds.....	44,846	Bungs, each.....	9,715

The total value of these shipments was \$589,142.67.

FRESH BEEF SHIPMENTS.

The following is a statement of beef exported to the United States Army during the fiscal year:

	Pounds.
26,888 forequarters, total weight.....	3,197,228
26,887 hindquarters, total weight.....	3,055,713

Shipments were made to different ports as follows:

	Pounds.
37 shipments to New York.....	5,941,071
12 shipments to San Juan, Porto Rico.....	257,091
1 shipment to San Diego, Calif.....	58,779
Total.....	6,256,941

PUBLICITY.

Increasing efforts have been made to acquaint the steamship trade with the facilities and lower prices of beef and other stores at the Panama Canal terminals. To this end letters have been written to many of the more important steamship companies and items have appeared from time to time in The Panama Canal Record.

MATERIAL SALVAGED FROM STEAMSHIP "MARNE."

From the wreck of the steamship *Marne*, which burned to the water's edge in the harbor of Cristobal on January 24, a great quantity of damaged material was received and laundered in the commissary plants. The Cristobal laundry handled 192,157 pieces and the Ancon laundry approximately 70,000 pairs of stockings and 10,000 yards of assorted dry goods.

CATTLE INDUSTRY.

The cattle industry division, comprising the cattle operations, pastures, plantations, dairy, hog farm, poultry farm, and the operation of the cattle steamers, continued under the supervision of Mr. W. B. Brown.

PURCHASES.

The delivery of cattle on the contract for 1918-19 was completed with the one hundred and thirty-fourth voyage of the steamship *Caribbean*, July 19, 1919; there having been left over on the old contract from deliveries to June 30, 1919, a total of 1,063 head, at \$0.0495 per pound.

On February 20, 1919, we closed a contract with the Canaderia Colombiana for a minimum of 30,000, maximum of 40,000 beef steers, and a minimum of 10,000, maximum of 20,000 canners at a flat rate of \$0.0567 per pound on board the ship, the entire 40,000 to 60,000 head to be accepted by us within 12 months.

Due to the termination of the war, the Army canceled their order for 20,000 head, which they had requested us to purchase in addition to our own requirements in the year 1919-20. As a result of these changes it was necessary to secure a modification of the contract entered into with Colombian interests. The following modifications were agreed to:

1. To cancel all canners.
2. To furnish the maximum of 40,000 head of beef cattle as per specifications in the original contract.
3. To extend delivery date six months, or until January 1, 1921.

In consideration of the above we agreed to increase the price from \$0.0567 per pound to \$0.0595 per pound.

Shipments of cattle from Colombia under these contracts were continued during the fiscal year 1920. On June 30, 1920, we had 15,833 head still due on contract, which will be transported to the Isthmus between July 1, 1920, and January 1, 1921.

Since signing this contract prices of cattle have shown a steady increase. Cattle which the Canal purchased under contract at \$0.0595 per pound are selling in the local markets of Colombia at from 9 to 9½ cents per pound.

With the stock now on hand and under contract we have sufficient beef to last from a year to eighteen months after the termination of the contracts. These purchases have resulted in a material saving to Canal employees in the price of beef and to Army and Navy organizations located on the Isthmus.

Purchase was made in Nicaragua of 1,101 head of cattle at a price of 4 cents per pound. In view of the long haul and consequent increased cost of transportation, 4-cent cattle in Nicaragua were practically no cheaper than 6-cent cattle in Colombia. The Nicaraguan cattle are also not as good quality as the Colombian cattle.

In addition to the above there were purchased in Colombia 6,167 fat hogs at 12 cents per pound; 804 shoats at 11 cents per pound; 826 sows at 12½ cents per pound. Local purchases were made on the Isthmus of 561 fat hogs at from 12½ to 15½ cents per pound.

No hogs or cattle were purchased in the United States during the year.

Open-market purchases made in addition to the above were as follows:

Item.	Unit.	Quantity.	Price.
Chickens.....	Each.....	2,691	\$0.50
Ducks.....	do.....	138	.60
Turkeys.....	do.....	1,415	1.75
Eggs.....	Dozen.....	327 $\frac{1}{2}$	.75
Coconuts.....	Each.....	7,840	.025
Coffee.....	Pound.....	250	.30
Corn.....	do.....	2,509	.011-.03
Melons.....	do.....	434	.05-.11
Mochillas.....	Each.....	240	1 2.50
Monkeys ²	do.....	25	3.00
Peas.....	Pound.....	1,090	.04
Plantain.....	Each.....	69,230	.01
Grass seed.....	Pound.....	76,349	.15-.17
Cocoa.....	do.....	300	.19

¹ Per dozen.

² Purchased for health department.

TRANSPORTATION.

The steamship *Caribbean* completed 26 round trips to Colombia during the year, bringing to the Canal Zone 11,779 head of beef cattle and various other produce. In addition, general cargo, passengers, and mail were carried. The total number of passengers carried was 376, and the total tonnage of general cargo amounted to 4,141.72, including specie valued at \$321,056.75. This steamer also made two round trips to Corinto, Nicaragua, bringing to the Zone 1,101 head of beef cattle. This ship was placed in dry dock for overhauling in September, being replaced by the steamship *Middlebury*, and remained there until December 31, 1919, sailing for Corinto, Nicaragua, on that date.

The steamship *Culebra* was not in active service during the entire year. This ship was placed in dry dock on May 10, 1919, for repairs and alterations, and remained there until April of this year, when transfer to the dredging division was made.

The steamship *Middlebury* entered the service of the cattle industry division on August 19, 1919, making her initial trip to Colombia on that date. During the year 17 round trips were made between Cristobal and Cartagena, bringing to the Isthmus 11,451 head of beef steers, 4,691 fat hogs, and other miscellaneous cargo, including passengers and mail. The total tonnage of general cargo amounted to 3,202.07, including specie valued at \$338,728.70. A total of 55 passengers was carried. This boat completed her last voyage on January 13, 1920, and was turned back to the United States Shipping Board at 7 a. m. on June 14, 1920.

The following table shows the monthly commercial steamship business:

Month.	General cargo.		Specie.		Mail revenue.	Passengers.	
	Tonnage.	Revenue.	Value.	Revenue.		Number.	Revenue.
1919.							
July.....	1,463.80	\$11,042.14	\$156,500.00	\$1,075.93	\$3.13	59	\$860.00
August.....	606.54	5,386.87	23,272.00	140.00	5.90	42	795.10
September.....	879.32	6,417.85	132,800.00	747.01	1.13	4	80.00
October.....	848.02	7,213.59	82,626.70	464.78	-----	15	260.00
November.....	649.32	4,924.27	81,760.00	534.24	9.02	11	220.00
December.....	598.52	4,908.21	25,542.00	164.26	15.73	17	300.00
1920.							
January.....	128.05	889.38	-----	-----	7.45	-----	-----
February.....	302.34	2,060.92	21,621.00	121.62	9.25	64	1,030.00
March.....	395.34	3,452.90	-----	-----	15.08	71	1,380.00
April.....	240.93	2,254.11	126,084.00	711.66	7.71	78	1,480.00
May.....	440.78	5,258.44	-----	-----	2.53	17	305.00
June.....	790.83	8,070.57	9,579.75	74.76	2.26	53	990.00
Total.....	7,343.79	61,879.25	659,785.45	4,034.26	79.19	431	7,700.10

The total net revenue to commercial steamship business is as follows:

General cargo, net.....	\$30,939.62
Specie.....	2,017.38
Mail.....	79.19
Passengers.....	7,700.10
Total.....	40,726.29

SALES.

The sales of live stock and poultry during the year were as follows:

	Unit.	To commissary.	To individuals and companies.
Beef cattle.....	Each.....	23,199	2,012
Bulls.....	do.....	1	-----
Cows.....	do.....	3	-----
Calves.....	do.....	1	1
Pigs.....	do.....	15	1
Shoats.....	do.....	-----	104
Hogs.....	do.....	7,216	12
Sows.....	do.....	249	1
Goats.....	do.....	4	-----
Chicks.....	do.....	1,124	8
Chickens.....	do.....	5,760	104
Turkeys.....	do.....	1,410	-----
Ducks.....	do.....	1,602	3

HEALTH.

The health of all stock in general continued very good throughout the year with the exception of the epidemic of anthrax, the deaths from which exceeded those of last year, there being a total of 326 head dying from positive anthrax, and 175 among the beef cattle at Mount Hope not reported as positive but which were undoubtedly anthrax. Eighty-one head died from arsenic poisoning at Caimito

during the month of June, 1920, the origin of which has not been definitely established to date.

Among the breeding stock we lost 2 Hereford and 6 Durham bulls from tuberculosis and 4 cows from tick fever; among the lean cattle 12 steers died from tick fever and 117 died from other causes, consisting of 20 cows and 5 calves in the breeding stock and 92 steers among the lean cattle; also 45 head of cows from the dairy stock, consisting of 15 Holsteins, which died of tick fever, and 30 native cows from other causes. The total losses from all causes amounted to 768 head for the year. A total of 38,448 head of cattle were handled through the pastures during the year, which gives a loss of less than 2 per cent. Considering the anthrax epidemic, which was unusually severe, and also that we passed through one of the longest and most severe dry seasons known for years, the loss is considered very light. The drought lasted six weeks longer than was expected and, due to being overstocked with cattle, the grass became very scarce. This necessitated the moving of cattle from place to place and careful handling in order not to incur greater losses.

The health at the Margarita hog farm was comparatively good. There was an epidemic of cholera during September which resulted in high death rate. The deaths for the year were as follows: 48 pigs, 240 shoats, 317 hogs, 23 sows, and 4 boars.

The death rate among the sows at Limon hog ranch was high, there being a total of 182. Deaths among the other stock were comparatively light.

The results of the operation of the Summit poultry farm have not improved since our report of last year, and in fact, the outlook is far from encouraging. During the year just closed the cost of chicken feed, practically all of which has to be imported from the United States, has advanced materially, adding greatly to the cost of operations. While the actual number of deaths was not as great as last year, there has been no decrease in the death rate among the stock.

PASTURES.

On April 1, 1920, the pastures on the west side of the Canal were consolidated and placed under the direct supervision of one gold foreman with headquarters at the new Miraflores camp. This unit is now known as the Mandingo-Farfan pastures.

On the same date the pastures on the east side of the Canal, with the exception of the Mount Hope beef pastures and the Mindi dairy pastures, were also consolidated and placed under the direct supervision of one gold foreman, with headquarters at Caimito. This unit is now known as the Eastside pastures. This consolidation resulted in a considerable reduction in both gold and silver forces and a notable decrease in the general pasture operating expenses.

The total area cleared and devoted to pastures, according to new surveys, amounts to 46,155 acres, of which 42,065 acres are completed and 4,090 will be completed during the coming six months.

During the year the sanitary department condemned a number of areas, amounting to 5,720 acres. This is a total loss to the cattle industry division of \$154,440 figured on the basis of \$27 per acre. This leaves a total of 40,435 acres.

The total virgin clearing for the year amounted to 4,090 acres, divided as follows:

	Aces.
Westside pastures:	
Gorgona-Mandingo area.....	1,669
Farfan area.....	856
Eastside pastures:	
Bohio area.....	1,565

The total area recleared amounted to 31,666 acres, being divided as follows:

	Aces.
Mount Hope area.....	3,025
Eastside pastures:	
Summit.....	4,252
Caimito.....	5,000
Bohio.....	1,790
Westside pastures:	
Gorgona-Mandingo area.....	6,252
New Mandingo.....	2,789
Pedro Miguel.....	2,076
Farfan pastures.....	6,482
Total.....	31,666

Seeding.—Seventy-six thousand three hundred and forty-nine pounds of grass seed were planted in the various pastures during the year, principally on the new clearing, although there was a small area reseeded.

Fencing.—Approximately 48 miles of new fence were constructed, including corrals, etc., divided as follows:

	Miles.
Farfan.....	29
New Mandingo and Pedro Miguel.....	14
Gambo.....	1½
Bohio.....	1½
Caimito.....	2

PLANTATIONS.

Contracts covering the operation of the following plantations were entered into between The Panama Canal and private contractors.

Bracho Mindi.—Twenty-five acres; contractor, A. Napoleon. Contractor receives payment for three-fifths of papaya shipped to commissary division; other produce two-thirds.

Davis Plantation.—Seventy acres; contractor, Thomas James. Contractor receives payment for two-thirds of all produce shipped in.

Chilibre Plantation.—Fifty-five acres; contractor, S. McLean. Contractor receives payment for two-thirds of all produce shipped in.

Frijoles Plantation.—We continued to operate this unit as an avocado orchard. However, this orchard suffered to a considerable extent due to the extremely dry season of this year.

Juan Mina Plantation.—The cultivation of the citrus grove continued throughout the year and the prospects for an abundant crop are very promising. A good crop of corn was harvested at this unit and used for feed at the Limon hog ranch. This plantation has been extended to include a branch at the Summit poultry farm. At the latter point 1,064 trees have been planted and are growing in good shape.

Limon Plantation.—This unit was converted into a hog ranch on July 1, 1919, and various improvements in the way of fences, pens, sheds, etc., were made. The initial shipment of breeding stock consisted of 289 sows and 9 boars. Report of operations is found elsewhere under Limon hog ranch. Bananas and other miscellaneous items of fruit and vegetables were shipped to the commissary division.

Las Cascadas Plantation.—This plantation remained under contract with Mr. W. T. Bardy.

Summit Plantation.—The only plantation operations at this point are the Chinese gardens, Nos. 1 and 2. These gardens have made splendid yield and the produce turned in to the commissary division.

The following statement shows items of produce shipped to the commissary division from the plantations and Chinese gardens:

Item.	Quantity.	Item.	Quantity.
Akee, each.....	522	Mustard, pounds.....	20,771
Bananas, bunches.....	22,609	Okra, pounds.....	31,046
Beans, string, pounds.....	71,098	Oranges, each.....	140,253
Beets, pounds.....	22	Onions, green, bunches.....	145,271
Bread fruit, pounds.....	4,616	Papaya, pounds.....	161,897
Cabbage, pounds.....	49	Pears, alligator.....	4,821
Cane, sugar, sticks.....	2,072	Parsley, bunches.....	142,661
Cocoanuts, each.....	4,834	Peppers, green, pounds.....	34,417
Celery, bunches.....	32,866	Peppers, hot.....	2,004
Corn, green, ears.....	2,710	Peppers, sweet.....	3,431
Coco beans, pounds.....	1,001	Plantain, each.....	32,548
Cucumbers, pounds.....	178,249	Peanuts, pounds.....	35
Egg plant, pounds.....	95,524	Pineapples, each.....	3,299
Endive, pounds.....	62,567	Pumpkins, pounds.....	77
Ginger, pounds.....	657	Radishes, red, bunches.....	115,975
Grapefruit, each.....	9,248	Radishes, white, bunches.....	40,929
Lettuce, pounds.....	60,223	Spinach, pounds.....	140,560
Lemons, each.....	5,483	Squash, pounds.....	6,211
Limos, each.....	53,503	Tomatoes, pounds.....	14,269
Mangoes, each.....	57,951	Turnips, pounds.....	385
Melons, pounds.....	270	Tania, pounds.....	1,200
Mint, bunches.....	80,491	Yucca, pounds.....	8,260

POULTRY FARM.

The egg production for the year amounted to $7,535\frac{9}{12}$ dozen hen and $497\frac{1}{12}$ dozen duck eggs, of which $5,339\frac{4}{12}$ dozen hen eggs were sent to the commissary; also $32\frac{4}{12}$ dozen duck eggs and $2,061\frac{11}{12}$ dozen hen eggs sent to incubator and $62\frac{2}{12}$ dozen hen eggs were sold to individuals.

DAIRY FARM.

The total milk production at the dairy farm amounted to $92,765\frac{1}{2}$ gallons, of which $79,458\frac{1}{4}$ were sent to the commissary along with $6,911\frac{1}{4}$ gallons of cream, and the balance of 11,994 gallons of milk was fed to calves.

Respectfully submitted.

R. K. MORRIS,
Chief Quartermaster.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal, Balboa Heights, Canal Zone.

TABLE NO. 1.—Occupants of Panama Canal and Panama Railroad quarters. June 30, 1920.

Place.	Gold.			Europeans.			West Indians.		
	Men.	Wo-men.	Children.	Men.	Wo-men.	Children.	Men.	Wo-men.	Children.
Ancon.....	805	607	482				110	18	12
Balboa ¹	1,210	727	1,068	16	12	17	761	403	842
Corozal.....	14	12	6				48	14	2
Pedro Miguel ²	303	190	212	1	1	4	³ 529	315	583
Paraiso.....	6	5	11	42	11	27	349	206	471
Culebra ⁴	9	5	1	108	70	158	⁵ 122	77	174
Gamboa ⁶	24	11	10				⁷ 169	57	79
Gatun.....	200	171	223				654	395	627
Cristobal ⁸	1,270	488	540	80	11	11	⁹ 1,832	385	857
Total.....	3,841	2,216	2,553	247	97	206	4,574	1,870	3,647

¹ Includes Palo Seco and quarantine station.² Includes Miraflores and Red Tank.³ Includes 63 Panamanians.⁴ Includes Empire.⁵ Includes 37 Panamanians.⁶ Includes Summit.⁷ Includes 70 Panamanians.⁸ Includes Colon Beach and Colon Hospital.⁹ Includes 637 Panamanians, 12 East Indians, and 6 colored Americans.

TABLE NO. 2.—Applications for family quarters on file June 30, 1920.

Stations.	Number.
D. Q. M., Balboa Heights.....	266
D. Q. M., Pedro Miguel.....	40
D. Q. M., Gatun.....	124
D. Q. M., Cristobal.....	188
Total.....	618

TABLE NO. 3.—Sales.

	General storehouse.	Cristobal storehouse.	Paraiso storehouse.	Total.
Number of local sales.....	9,279	7,091	1,701	18,071
Number of sales to steamships.....	1,495	1,770		3,265
Number of credit sales.....	49,061	25,189	97	74,347
Total.....	59,835	34,050	1,798	95,683
Value of local sales ¹	\$131,975.58	\$101,512.00	\$4,332.24	\$237,819.82
Values of sales to steamships ²	526,926.72	747,629.46		1,274,556.18
Value of credit sales ³	1,036,555.66	475,076.59	1,689.93	1,513,322.18
Total.....	1,695,457.96	1,323,918.05	6,022.17	3,025,698.18

¹ Includes fuel oil sold locally as follows: Balboa, \$17,723.36; Cristobal, \$2,845.10.² Includes fuel oil sold to steamships as follows: Balboa, \$387,328.99; Cristobal, \$562,361.72.³ Includes material issued on foreman's orders to Army, Navy, etc., and for work on individuals' and companies' jobs: General storehouse, \$556,206.92; Cristobal storehouse, \$144,829.97; total, \$701,036.89.

TABLE NO. 4.—Value of material received during the fiscal year 1919-20 on requisition.

	1919							1920						
	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	January.	Febru-ary.	March.	April.	May.	June.	Total.	
Construction, operation, and maintenance:														
Supply department (stock)	\$303,674.90	\$374,955.28	\$346,589.62	\$311,093.75	\$354,166.21	\$756,980.53	\$504,474.13	\$376,560.48	\$429,755.14	\$544,128.18	\$825,683.84	\$584,339.92	\$5,712,421.98	
Printing plant (stock)	4,512.49	13,101.50	26,483.48	3,535.32	9,323.07	10,671.41	22,821.07	7,705.76	11,552.96	23,107.07	10,184.39	16,633.06	159,632.48	
Lock operation	8,348.22	2,061.25	956.86	3,067.26	1,065.20	2,151.55	1,754.08	7,538.03	408.52	3,461.19	893.39	3,070.47	24,661.02	
Dredging division	1,840.74	40.70	2,741.83	2,741.83	1,173.52	2,374.05	338.10	249.50	10,237.00	826.70	45.60	2,204.33	21,077.07	
Electrical division	69,987.30	32,634.99	28,988.07	12,680.26	31,613.04	115,948.18	49,178.22	44,780.11	42,618.26	65,084.72	51,566.09	49,076.08	591,155.32	
Municipal engineering	21,445.25	8,307.51	13,053.04	23,567.47	1,067.26	12,942.64	6,208.55	2,731.25	1,720.44	9,134.36	140.89	24,223.86	124,542.52	
Mechanical division	1,083.85	22,271.25	8,661.79	700.18	974.23	29,738.59	18,961.90	4,494.98	1,267.74	8,044.65	4,447.28	9,538.94	110,215.47	
Accounting department	322.00	115.00	445.68	179.50	802.73	4,130.34	1,344.02	368.78	1,016.01	163.61	586.50	786.12	10,260.29	
Supply department—chief quartermaster and substance	1,581.04	3,543.80	2,876.51	10,102.78	377.59	45,676.85	4,094.95	1,111.11	821.13	13,067.31	4,130.84	24,664.04	112,037.95	
Building division	18,301.81	18,912.43	14,863.98	75,833.80	33,499.17	132,993.32	91,633.36	81,161.38	34,082.57	76,253.80	2,272.23	18,183.87	598,011.72	
Engineer of docks	553.29	4,706.29	4,706.29	3,600.00	375.00	7,344.23	170.83	58.00	87.50	78.00	17.25	611.54	3,268.58	
Fortifications	916.90	6,919.00	31.50	9.00	236.00	1,133.50	12,628.20	1,607.07	275.25	9.90	55.20	50.00	20,178.25	
Marine division	112.50	592.08											16,740.20	
Operation and maintenance, general	542.80	10,249.72	2,128.85	851.87	3,017.31	1,697.36	1,440.52	459.30	1,583.51	3,308.98	3,237.76	6,071.01	34,588.99	
Total	429,912.16	490,065.74	456,745.37	447,963.02	436,691.23	1,123,782.55	715,068.02	521,825.75	535,456.03	743,543.47	903,261.26	739,478.24	7,513,792.84	
Health department	4,288.77	23,091.03	11,846.77	2,250.65	5,273.39	13,713.20	8,602.76	3,951.66	7,646.79	4,408.44	3,432.77	24,988.90	113,475.13	
Civil affairs	522.87	507.08	111.05	9.00	108.11	33.17	1,303.04	3,886.14	84.75	21.63	152.16	16.33	3,753.33	
Posts and schools	1,144.82	883.92	3,022.90	271.16	424.96	1,028.51	1,325.39	1,119.42	1,488.34	2,106.50	9,416.59	1,668.35	23,901.86	
Panama Railroad Company	2,832.24	7,164.65	21,974.88	20,238.92	7,623.18	3,630.10	5,979.48	1,599.70	141.25	2,098.23	16,547.68	9,861.20	99,711.51	
Panama Railroad Company (commissary)	832.51	4,048.15	5,661.16	1,102.50	2,115.50	2,136.22	1,599.32	542.20	1,996.00	1,755.63	2,405.30	1,080.00	25,294.49	
Law department			189.75	67.25	6.75	12.00	68.89	633.50	7.50	151.70	4.00	1,179.36	2,320.70	
Grand total	439,573.37	525,760.57	499,551.88	471,902.50	452,248.12	1,144,335.75	733,946.90	530,558.37	546,820.66	754,085.60	935,219.76	778,253.38	7,812,251.86	
Local purchases on the Isthmus:														
Coal purchased from Panama Railroad Company	27,150.53	24,228.85	23,497.55	27,256.12	20,045.06	27,721.39	22,679.64	22,685.14	30,821.90	29,231.99	24,558.75	31,878.63	311,555.55	

TABLE NO. 4.—*Value of material received during the fiscal year 1919-20 on requisition—Continued.*

	1919						1920						
	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	January.	Febru-ary.	March.	April.	May.	June.	Total.
Local purchases on the Isth- mus—Continued.													
Miscellaneous purchases from Panama Railroad Company.....	\$11,686.91	\$9,150.57	\$8,978.44	\$11,526.45	\$13,046.00	\$14,078.91	\$10,101.43	\$9,294.25	\$10,124.41	\$11,268.39	\$9,114.05	\$7,536.45	\$125,906.26
Hotels.....	54,310.98	50,827.14	47,924.83	50,531.73	44,971.22	49,567.36	53,554.71	57,151.10	64,891.08	59,619.70	53,388.87	54,129.12	640,919.94
Tivoli.....	6,929.76	6,047.71	5,679.23	6,383.99	6,459.23	7,479.51	8,815.95	7,722.95	9,661.65	8,884.28	7,777.73	5,465.03	87,307.02
Dredging division.....	6,566.14	6,917.96	7,074.63	8,330.04	6,835.28	8,692.15	7,912.18	7,553.11	8,686.24	10,810.05	10,314.65	11,172.49	101,064.92
Health department.....	15,100.18	14,502.22	15,888.54	15,680.39	13,961.80	14,967.22	16,381.53	16,285.72	17,844.16	17,325.55	17,549.29	17,474.18	192,960.78
Miscellaneous purchases from local merchants...	1,869.98	1,100.75	1,461.39	1,101.25	1,031.48	7,287.52	5,142.91	17,797.17	35,928.54	5,287.78	3,102.70	109,445.31	190,556.78
Total local purchases on Isthmus.....	123,613.58	112,775.20	110,554.61	121,009.97	106,350.07	129,794.06	124,588.35	138,489.44	177,760.98	142,427.74	125,806.04	237,101.21	1,650,271.25

TABLE NO. 5.—*Sales of obsolete and scrap material and equipment, July 1, 1919, to June 30, 1920, the original cost of which amounted to more than \$500.*

Bills, sale No.	Name of purchaser.	Article sold.	Sale value.
C. S. 111.	A. M. Loeb.	25.75 net tons mixed scrap.	\$515.00
C. S. 141.	Pinel Bros.	12 net tons mixed scrap.	240.00
C. S. 157.	J. O. Codar.	Motor, gasoline, 90 horsepower, No. K. C. 807.	350.00
C. S. 195.	A. Livingston.	2 tanks, B. 1., 5,776 gallons capacity.	300.00
C. S. 213.	Rodolfo Chiari.	Generator, Woods, 2½ H. W.	300.00
C. S. 241.	Thompson & Daly.	48,200 pounds scrap iron.	482.00
C. S. 334.	do.	Barge, steel, coal, No. 56.	150.00
C. S. 335.	La Veloce Navigazione Italiana a Vapore.	20 tons rail.	600.00
C. S. 365.	A. Livingston.	Crane, Loco, 20 tons, No. 14.	2,500.00
C. S. 742.	Capt. C. Ellison.	Boat, tug Chame, W. property.	15,350.00
C. S. 767.	F. A. Scherberg.	22,300 pounds miscellaneous scrap.	223.00
C. S. 818.	L. Martinez.	17,500 pounds channels and I-beams.	262.50
C. S. 827.	W. S. Perry.	18 tons scrap iron.	360.00
C. S. 865.	John Hilbert.	37,400 pounds miscellaneous scrap iron.	374.00
C. S. 886.	C. A. Dady.	41,900 pounds mixed scrap.	419.40
C. S. 956.	Edward R. Japs.	10 tons angles.	200.00
C. S. 1243.	C. A. Nelson.	52,800 pounds scrap iron.	528.00
C. S. 1298.	S. P. Santos.	17,970 pounds miscellaneous scrap iron.	179.70
C. S. 1351.	J. B. Pintt.	Scale, track, Fairbanks No. 108.	350.00
C. S. 1387.	F. Y. Thompson.	12,540 pounds miscellaneous scrap.	188.10
C. S. 1700.	Fuerza y Luz Co.	8 transformers.	432.75
C. S. 1788.	Pinel Bros.	21,200 pounds scrap iron.	318.00
C. S. 1850.	S. P. Santos.	Tractor, Moline.	400.00
C. S. 2081.	do.	16,489 tons scrap.	569.67
B. S. 6581.	do.	48,000 pounds scrap pipe.	587.00
B. S. 7667.	American Trade Development Co.	9,279 feet b. m. second-hand native lumber.	510.35
B. S. 8031.	Thos. R. Lombard.	300 drums, oil, light, from "Marne" and "Olockson."	600.00
B. S. 8047.	H. Baxter.	210 drums, oil, light, from "Marne" and "Olockson."	420.00

TABLE NO. 6.—*Houses, apartments, and occupants, by districts, of gold and silver quarters, as of June 30, 1920.*

Districts.	Gold.		Silver.		Total.	
	Family.	Bachelor.	Family.	Bachelor.	Family.	Bachelor.
Ancon-Balboa:						
Houses occupied.	465	44	58	34	523	78
Rooms or apartments.	1,065	806	436	162	1,501	968
Number of occupants.	3,715	1,058	1,655	475	5,370	1,533
Corozal:						
Houses occupied.	9	3	1	3	10	6
Rooms or apartments.	11	3	2	17	13	20
Number of occupants.	24	8	6	58	30	66
Pedro Miguel-Paraiso:						
Houses occupied.	97	9	100	14	197	23
Rooms or apartments.	188	89	600	117	788	206
Number of occupants.	596	114	2,160	385	2,756	499
Culebra-Empire:						
Houses occupied.	9	2	35	3	44	5
Rooms or apartments.	10	2	126	5	136	7
Number of occupants.	11	4	328	45	339	49
Gamboa-Summit:						
Houses occupied.	6	3	12	5	19	8
Rooms or apartments.	12	11	69	27	81	38
Number of occupants.	32	13	193	112	225	125
Gatun:						
Houses occupied.	59	12	62	11	121	23
Rooms or apartments.	164	42	415	122	579	164
Number of occupants.	550	44	1,428	248	1,978	292
Cristobal:						
Houses occupied.	161	27	71	34	235	61
Rooms or apartments.	440	458	389	117	829	575
Number of occupants.	1,392	776	1,646	1,792	3,038	2,568
Total:						
Houses occupied.	809	100	340	104	1,149	204
Rooms or apartments.	1,890	1,411	2,037	567	3,927	1,978
Number of occupants.	6,320	2,017	7,416	3,115	13,736	5,132

TABLE NO. 7.—*Operation of Hotel Tivoli, July 1, 1919, to June 30, 1920.*

Month.	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Total cost of operation.	Revenue.	Surplus.	Deficit.
1919.							
July.....	\$6,650.98	\$3,394.97	\$3,461.28	\$13,507.23	\$14,264.30	\$757.07	.....
August.....	6,439.37	3,328.46	4,147.35	13,915.18	12,637.15	.....	\$1,278.03
September.....	5,361.40	3,251.99	4,011.84	12,625.23	11,942.35	.....	682.88
October.....	6,649.14	3,411.83	6,360.32	16,421.29	12,766.45	.....	3,654.84
November.....	6,670.38	3,423.75	4,288.85	14,382.95	14,489.10	106.12	.....
December.....	7,541.33	3,608.43	3,932.85	15,082.61	14,402.05	.....	680.56
1920.							
January.....	8,290.20	3,713.21	5,108.03	17,111.44	20,848.10	3,736.66	.....
February.....	8,976.50	3,663.34	4,826.52	17,466.36	25,697.75	8,231.39	.....
March.....	8,985.62	4,300.69	7,270.01	20,556.32	26,642.00	6,085.68	.....
April.....	7,915.39	4,477.97	4,223.17	16,616.53	20,309.55	3,693.02	.....
May.....	9,209.17	4,205.80	5,001.87	18,416.84	20,492.30	2,075.46	.....
June.....	6,006.97	4,010.97	4,487.93	14,505.87	11,880.25	.....	2,625.62
Total.....	\$8,696.45	\$4,791.41	\$7,120.02	\$19,607.88	\$206,371.35	\$24,685.40	\$8,921.93

Net surplus, \$15,763.47.

TABLE NO. 7A.—*Summary of operations, Hotel Aspinwall, July 1, 1919, to June 30, 1920.*

Month.	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Total cost of operation.	Revenue.	Surplus.	Deficit.
1919.							
July.....	\$967.93	\$981.81	\$977.99	\$2,927.73	\$2,298.37	.....	\$629.36
August.....	1,837.53	1,113.96	1,521.01	4,522.50	4,473.75	.....	48.75
September.....	2,316.09	1,204.69	656.00	4,176.78	5,015.33	\$838.55	.....
October.....	1,352.10	1,160.77	1,113.37	3,626.24	2,314.85	.....	1,311.39
November.....	1,730.75	1,109.99	1,130.63	3,971.37	3,628.29	.....	343.08
December.....	1,510.67	1,028.65	980.22	3,519.54	2,680.70	.....	838.84
1920.							
January.....	1,375.46	1,019.53	1,169.51	3,564.50	2,798.61	.....	765.89
February.....	1,831.48	1,191.05	1,237.70	4,260.23	4,228.98	.....	31.30
March.....	2,263.42	1,532.97	1,569.62	5,366.01	5,410.88	44.87	.....
April.....	2,298.12	1,763.33	1,644.14	5,705.59	4,471.42	.....	1,234.17
May.....	2,906.61	1,534.85	1,834.92	6,276.38	5,286.51	.....	989.87
June.....	2,292.02	1,408.91	1,711.53	5,412.46	3,958.40	.....	1,454.06
Total.....	22,732.18	15,050.51	15,546.64	53,329.33	46,566.04	883.42	7,446.71

Net deficit, \$6,763.29.

TABLE NO. 8.—*Summary of operations of restaurants, July 1, 1919, to June 30, 1920.*

Month.	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Total cost of operation.	Revenue.	Surplus.	Deficit.
1919.							
July.....	\$41,841.16	\$10,911.01	\$4,150.62	\$56,902.79	\$55,715.29	.....	\$1,187.50
August.....	38,821.64	10,403.17	5,145.55	54,370.36	53,404.98	.....	965.38
September.....	37,652.55	10,407.45	4,085.53	52,145.53	50,668.53	.....	1,477.00
October.....	37,524.61	10,343.44	3,925.13	51,793.18	51,963.57	\$170.39	.....
November.....	36,011.04	10,266.67	4,192.50	50,500.21	50,336.98	.....	163.23
December.....	37,414.71	10,315.81	4,135.49	51,866.01	54,124.21	2,258.20	.....
1920.							
January.....	43,220.80	10,402.41	4,051.46	57,674.67	56,804.41	.....	870.26
February.....	40,476.28	10,996.49	4,080.97	55,553.74	58,857.30	3,303.56	.....
March.....	45,633.45	13,862.47	4,863.62	64,359.54	61,222.85	.....	3,136.69
April.....	45,176.78	12,325.58	3,833.68	61,336.04	62,206.52	870.48	.....
May.....	44,917.34	12,310.46	4,391.59	61,619.39	61,012.74	.....	576.65
June.....	46,518.93	12,148.08	6,176.64	64,843.65	61,861.89	.....	2,981.76
Total.....	495,239.29	134,693.04	53,032.78	682,965.11	678,209.27	6,602.63	11,358.47

Deficit.....\$4,755.84
 Indirect expense (not charged).....27,917.24

Total.....32,673.08
 Net surplus on messes—see Table No. 9.....5,516.57

Net deficit on restaurants and laborers' messes if indirect charges for building repairs, fuel, light, etc., had been made.....27,156.51
 Above statement includes services for departments and divisions of The Panama Canal.

TABLE NO. 9.—*Summary of operations, laborers' messes, July 1, 1919, to June 30, 1920.*

Month.	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Total cost of operation.	Revenue.	Surplus.	Deficit.
1919.							
July.....	\$11,831.71	\$1,701.16	\$1,464.45	\$14,997.32	\$15,411.40	\$414.08	.....
August.....	11,575.12	1,734.35	1,717.60	15,027.07	15,165.78	138.71	.....
September.....	10,625.26	1,664.71	1,461.24	13,751.21	13,900.98	149.77	.....
October.....	10,407.07	1,665.48	1,276.35	13,348.90	14,108.25	759.35	.....
November.....	9,037.42	1,657.51	1,523.15	12,218.08	11,975.96	.....	\$242.12
December.....	10,568.76	1,576.25	1,164.10	13,309.11	14,265.63	956.52	.....
1920.							
January.....	10,385.17	1,582.22	1,060.59	13,027.98	13,513.29	485.31	.....
February.....	15,564.73	1,618.21	897.03	18,079.97	13,245.82	.....	4,834.15
March.....	17,798.14	3,292.77	1,627.40	22,718.31	31,596.22	8,877.91	.....
April.....	8,657.85	1,717.62	962.72	11,338.19	11,894.52	556.33	.....
May.....	7,527.32	1,657.11	1,248.13	10,432.56	9,946.70	.....	485.86
June.....	7,232.35	1,590.80	1,968.86	10,792.01	9,532.73	.....	1,259.28
Total.....	131,210.90	21,458.19	16,371.62	169,040.71	174,557.28	12,337.98	6,821.41

Net surplus, \$5,516.57.

TABLE NO. 10.—*Obsolete and surplus material (appraised values).*

On hand July 1, 1919.....	\$161,472.69
Received during fiscal year 1920.....	114,385.46
Total.....	275,858.15
Account sales over appraised values, issues R. F. S., etc.....	71,382.95
Total.....	347,241.10
Shipped to United States.....	\$41,761.22
Sales.....	119,132.23
Transfers and issues.....	130,334.19
Surveyed and scrapped.....	5,195.00
	296,422.64
Balance to account for June 30, 1920.....	50,818.46

TABLE NO. 11.—*American scrap operations.*

American and shop scrap.	\$5 net ton.		\$7 net ton.		Total.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
On hand July 1, 1919.....	17,417.968	\$87,089.84	1,980.40	\$13,862.80	19,398.368	\$100,952.64
Received.....	6,811.532	34,057.66	533.81	3,736.67	7,345.342	37,794.33
Total to account for.....	24,229.500	121,147.50	2,514.21	17,599.47	26,743.710	138,746.97
Issued from July 1, 1919, to June 30, 1920.....	18,813.912	94,069.56	2,214.23	15,499.61	21,028.142	109,569.17
Balance on hand June 30, 1920.....	5,415.588	27,077.94	299.98	2,099.86	5,714.568	29,177.80

TABLE NO. 12.—*Fuel oil handled.*

	Balboa.	Mount Hope.	Total.
Number of barrels received by The Panama Canal.....	426,541	454,628	881,169
Number of barrels used by The Panama Canal.....	290,376	76,420	366,796
Number of barrels pumped for individuals and companies.....	508,326	3,150,967	3,659,293
Number of barrels sold by The Panama Canal.....	269,699	394,376	664,075
Number of barrels representing miscellaneous transfers on tank farm.....	23,005	26,648	49,653
Total.....	1,517,947	4,103,039	5,620,986
Number of ships handled, including Panama Canal craft.....	347	848	1,195

TABLE NO. 13.—*Comparative statement of output of manufacturing plants, commissary division, supply department, fiscal years 1916 to 1920.*

	1916	1917	1918	1919	1920
Laundry (Cristobal):					
Total number of pieces handled.....	3,970,674	3,649,814	3,341,613	3,360,443	3,481,718
Value of output.....	\$94,719.68	\$91,722.87	\$87,271.73	\$101,746.03	\$124,762.76
Laundry (Ancon):					
Total number of pieces handled.....	4,509,308	4,094,273	5,642,383	4,988,676	4,236,158
Value of output.....	\$98,242.33	\$93,262.51	\$132,047.11	\$132,033.90	\$131,188.75
Bakery:					
Total output—Bread, loaves.....	6,385,546	7,211,417	7,504,920	5,438,121	5,278,213
Total output—rolls, each.....	1,093,792	1,129,400	637,656	234,624	274,068
Total output—cakes, pounds.....	140,477	132,493	81,386	131,708	173,338
Total output—doughnuts, dozen.....	50,982	54,840	38,075	14,654	12,278
Total output—pies, each.....	19,019	28,559	48,357	.....	46,534
Total output—soda crackers, pounds.....	.....	.....	.....	15,152	37,153
Value of output.....	\$297,439.63	\$365,962.92	\$539,239.48	\$454,020.16	\$492,226.86
Coffee roasting:					
Roasted coffee produced, pounds.....	381,630	427,921	382,233	336,354	273,460
Value of output.....	\$83,535.69	\$94,023.30	\$106,584.48	\$96,242.64	\$99,482.56
Ice manufacturing:					
Ice manufactured, tons.....	39,461	45,044	48,672	52,513	51,266
Value of output.....	\$230,834.69	\$263,507.40	\$282,297.60	\$287,537.47	\$333,456.00
Ice cream plant:					
Ice cream manufactured, gallons.....	167,528	163,326	216,262	252,344	132,621
Milk bottled, quarts.....	.....	386,164	452,697	399,997	456,639
Cream bottled, quarts.....	.....	11,697	7,809	7,710	12,538
Value of output.....	\$251,880.93	\$226,024.22	\$339,926.34	\$423,623.67	\$320,252.34
Sausage factory and pickling department:					
Corned beef produced, pounds.....	196,169	188,271	238,142	192,998	123,366
Hamburger steak produced, pounds.....	125,712	135,677	208,859	186,005	74,618
Home-made sausage produced, pounds.....	8,553	37,718	47,451	67,241	101,292
Corn pork produced, pounds.....	2,932	12,027	56,687	80,134	29,196
Tongue produced, pounds.....	5,450	12,913	9,730	34,320	39,193
Bacon smoked, pounds.....	.....	.....	60,144	60,669	50,762
Ham, smoked, pounds.....	.....	.....	65,208	61,137	53,492
Miscellaneous sausage produced, pounds.....	.....	10,856	240,521	288,846	382,748
Shoulder, smoked, pounds.....	.....	.....	.....	12,409	29,956
Beef, smoked, pounds.....	.....	.....	.....	7,979	25,773
Ham, boiled, pounds.....	.....	.....	.....	1,822	.....
Shoulder, boiled, pounds.....	.....	.....	.....	2,136	.....
Value of output.....	\$54,969.67	\$55,525.14	\$101,516.07	\$275,121.87	\$221,781.57
Industrial Laboratory:					
Value of output.....	\$116,176.40	\$179,363.56	\$275,682.50	\$323,268.63	\$347,508.07
Abattoir:					
Cattle killed, head.....	7,762	13,180	21,731	31,209	23,199
Hogs killed, each.....	.....	681	11,483	13,553	7,565
Chickens, turkeys, ducks, etc., killed, each.....	.....	.....	41,435	40,031	9,900
Weight of dressed beef produced, pounds.....	3,843,377	7,118,803	10,788,446	15,974,950	11,335,120
Weight of dressed hogs produced, pounds.....	.....	66,999	991,903	1,327,268	687,633
Value of output.....	\$446,882.69	\$927,551.06	\$2,025,280.75	\$3,071,878.15	\$2,315,246.47
Total value of output.....	\$1,674,682.11	\$2,296,942.98	\$3,889,846.06	\$5,165,472.52	\$4,385,905.38

TABLE No. 14.—Quantities of certain staple articles purchased during the fiscal year ended June 30, 1920, as compared with the previous year.

	Unit.	Quantity.	
		1919	1920
Groceries and meats:			
Beef, native.....	Pounds...	29,361,885	20,791,217
Butter.....	do.....	481,126	485,142
Coffee.....	do.....	177,217	272,214
Corn.....	do.....	440,770	108,711
Cured and pickled meats.....	do.....	145,410	406,853
Eggs.....	Dozen.....	971,243	601,237
Fish, canned.....	Pounds.....	114,638	618,707
Flour.....	do.....	7,614,491	6,696,498
Fresh meats.....	do.....	159,678	424,375
Hogs.....	do.....	1,853,493	925,716
Milk, evaporated and condensed.....	do.....	2,008,280	2,755,624
Milk, fresh.....	do.....	138,675	165,749
Rice.....	Pounds.....	1,666,753	2,924,650
Sugar.....	do.....	4,147,754	4,343,294
Tomatoes in tins.....	do.....	469,000	402,116
Fresh vegetables:			
Cabbage.....	do.....	977,570	1,090,467
Onions.....	do.....	884,858	752,667
Potatoes.....	do.....	6,713,534	6,232,079
Yams.....	do.....	685,145	292,260
Fresh fruits:			
Apples.....	do.....	706,989	767,845
Grapefruit.....	Each.....	200,814	116,010
Oranges.....	Dozen.....	215,014	125,189

TABLE No. 15.—Comparative selling prices for June 30, 1920, as against June 30, 1919.

	Unit.	Prices.	
		1919	1920
Fresh meats:			
Beef, stew (native).....	Pound.....	\$0.08	\$0.09
Beef, chuck roast, 3 pounds and over (native).....	do.....	.12	.14
Beef, rib roast, not under 3 pounds (native).....	do.....	.17	.19
Beef, rump roast (special).....	do.....		
Beef, rump roast (native).....	do.....	.18	.20
Beefsteak, sirloin (special).....	do.....		
Beefsteak, sirloin (native).....	do.....	.18	.20
Mutton, loin chops.....	do.....	.37	.51
Pork, hams, fresh.....	do.....	.32	.46
Pork, loin chops.....	do.....	.45	.50
Veal, loin chops.....	do.....	.49	.61
Cured and pickled meats:			
Bacon, States, break-fast, whole piece.....	do.....	.55	.61
Ham, sugar-cured, States, whole piece.....	do.....	.50	.47
Bacon, break-fast, native, whole piece.....	do.....	.38	.54
Ham, sugar-cured, native, whole piece.....	do.....	.35	
Poultry and game:			
Chickens, corn-fed.....	do.....	.53	.57
Dairy products:			
Butter, creamery, special.....	do.....	.64	.72
Eggs, fresh.....	Dozen.....	.56	.61
Fish:			
Codfish, dried.....	Pound.....	.20	.18
Fish, fresh (native).....	do.....	.13	.14
Vegetables:			
Onions.....	do.....	.10	.04
Potatoes, white.....	do.....	.03½	.10
Fruits, fresh:			
Apples.....	do.....	.12	.15
Groceries:			
Beans, navy, dried.....	do.....	.08	.10
Coffee, ground, No. 1.....	do.....	.24	.31
Corn, sugar.....	Tins, 2s..	.16	.16
Flour.....	Pound.....	.07	.07
Lard, compound.....	do.....	.33	.32
Milk, evaporated.....	Tins, 1s..	.14	.15
Peas, extrasifted.....	Tins, 2s..	.19	.16
Rice.....	Pound.....	.09	.13
Soap, laundry.....	Cake.....	.09	.09
Sugar, granulated.....	Sacks, 5s..	.50	.85
Tomatoes.....	Tins, 3s..	.18	.24

TABLE No. 16.—Articles purchased by the products buyer in Costa Rica during period from June 30, 1919, to June 30, 1920.

Article.	Unit.	Quantity.	Amount.
Beets.....	Pound....	4,167	\$58.44
Cabbage.....	do.....	191,682	3,830.94
Carrots.....	do.....	34,263	448.85
Grapefruit.....	Each.....	99,319	2,470.19
Oranges, select.....	do.....	257,787	4,874.62
Oranges, tropical.....	do.....	31,465	138.02
Potatoes, sweet.....	Pound....	102,796	1,630.51
Potatoes, white.....	do.....	2,547,666	43,412.69
Sugar.....	do.....	2,029,400	195,973.90
Tomatoes.....	do.....	2,608	121.65
Turnips.....	do.....	47,844	643.14
Total value.....			253,602.95

TABLE No. 17.—More important articles purchased in Haiti during period from June 30, 1919, to June 30, 1920.

None. (Agency discontinued.)

List of the important articles¹ purchased locally,² from plantations of the cattle industry,³ from Corozal farm and Army truck gardens, from local producers and importing agencies, and by the local commissary buyer, Panama.

	Unit.	Quantity.	
		1919	1920
Bananas.....	Bunches..	28,044	33,630
Do.....	Dozens...	16,868	2,205
Beans.....	Pounds...	70,570	29,784
Celery.....	Bunches..	41,703	46,042
Cocoanuts.....	Dry.....	184,630	135,573
Corn, green.....	Ears.....	180,115	127,515
Cream.....	Gallons...	3,056	10,059
Cucumbers.....	Pounds...	117,275	194,094
Eggs, fresh.....	Dozens...	30,161	6,951
Fish.....	Pounds...	448,299	429,690
Hogs.....	do.....	853,493	925,716
Lettuce.....	do.....	62,666	74,692
Limes.....	Each.....	562,364	444,982
Macaroni.....	Pounds...	35,850	92,365
Mangoes.....	do.....	267,211	234,542
Milk.....	Gallons...	50,906	92,849
Onions, green.....	Bunches..	203,197	193,266
Oranges.....	Each.....	1,617,850	261,527
Papaya.....	Pounds...	235,935	162,981
Parsley.....	Bunches..	103,691	167,142
Pears, alligator.....	Each.....	72,316	54,873
Pineapples.....	do.....	58,198	48,693
Plantains.....	do.....	320,779	1,318,804
Potatoes, sweet.....	Pounds...	215,397	9,155
Radishes.....	Bunches..	93,895	150,884
Rice.....	Pounds...	906,415	1,930,400
Spinach.....	Bunches..	76,908	6,156
Do.....	Pounds...	42,858	15,938
Soap.....	Bars.....	51,890	5,820
Squash.....	Pounds...	112,578	86,660
Sugar.....	do.....	1,740,022	1,906,991
Tomatoes.....	do.....	54,494	20,676
Yams.....	do.....	898,329	292,260

¹ In addition to the products listed, various purchases were made of fruits and vegetables in season and of different commodities, including chayotes, guaves, dasheen, egg plant, endive, mint, okra, peppers, and cow peas.

² Total value of all local purchases was \$630,108.60.

³ Detail of all supplies received from Panama Canal pastures, plantations, hog and poultry farms, etc., will be included in the report of the cattle industry.

APPENDIX E.

REPORT OF THE AUDITOR IN CHARGE OF THE ACCOUNTING DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE,
September 7, 1920.

SIR: I have the honor to submit the following report of transactions of the accounting department for the fiscal year ended June 30, 1920:

ORGANIZATION.

The following are the important changes in the personnel of the department that took place during the year: Mr. T. L. Clear, after serving for about a year overseas in the Inspector General's Department of the Army, returned during September, 1919, and resumed his duties as collector of The Panama Canal, Mr. E. P. Sine resigning. Mr. A. H. Mohr was appointed deputy collector upon his return from Army service, succeeding Mr. T. F. Roth. Mr. J. H. McLean, paymaster, resigned November 15, 1919, Mr. R. W. Glaw, assistant paymaster, being promoted to the position of paymaster on January 24, 1920. On the same date Mr. C. L. Bryan was appointed assistant paymaster. Judge B. F. Harrah has continued as assistant auditor in charge of the office of the accounting department in Washington, D. C., while Mr. A. C. Whitton succeeded Mr. H. P. Merrill as disbursing clerk when the latter resigned in July, 1919.

PAYMASTER.

Disbursements to the amount of \$38,426,733.29 were made during the year by the paymaster. Of this amount the sum of \$15,134,762 was on account of the Panama Railroad Company. Employees on the gold roll of The Panama Canal were paid \$8,391,066.16, and those on the silver roll \$6,505,810.88, while the sum of \$8,395,094.25 was paid on miscellaneous vouchers. Collections on the pay rolls amounted to \$5,191,946.43. Of this amount the sum of \$4,220,524.88 was collected for coupon books, the remainder being for miscellaneous items. Of the total collections on pay rolls the sum of \$4,948,704.48 was disbursed directly by the paymaster, Panama Canal, the balance, \$243,241.95, being transferred to the collector's accounts. The American Foreign Banking Corporation was continued as a Government depository, and the Panama Railroad Company also opened an account with the International Banking Corporation. During the year the sum of \$8,820,072, Panama Railroad funds, was transferred to the treasurer, New York. This amount includes \$666,072 mutilated currency, due to rapid deterioration of paper money through climatic conditions. The cash situation on the Isthmus improved somewhat. The sum of \$1,224,000 was brought by the paymaster from the States during the year. (See Table No. 29).

COLLECTOR.

The collections repaid to appropriations amounted to \$14,745,-634.31, as compared with \$10,364,875.07 collected during the prior year. The sum of \$8,848,978.06 was collected for deposit as miscellaneous receipts. Of these amounts there was received by the disbursing clerk at Washington the sum of \$1,486,112.16 as a credit to appropriations, while \$83,109.29 were collected as miscellaneous receipts. Deposits for the payment of tolls and bills for supplies and services were made with assistant treasurers of the United States to the credit of the collector in the sum of \$2,287,783.21. Similar deposits were made with the collector on the Isthmus in the sum of \$18,631,811.32. The deposits with assistant treasurers show a reduction as compared with the previous year of over \$2,000,000, while the deposits on the Isthmus increased over \$6,500,000. Of the total deposits, \$20,919,594.53, which is \$4,476,220.50 in excess of last year's total, the sum of \$455,251.87 was refunded upon settlement of accounts. Money-order funds to the amount of \$1,501,000 were transferred to the Postmaster General of the United States in payment of money orders drawn on the United States. Other disbursements of miscellaneous funds to the amount of \$367,473.46 were made by the collector. Collections were also made on account of the Panama Railroad Company in the sum of \$21,532,848.43, an increase from last year of \$1,991,903.47. (See Tables Nos. 32, 33, 34, and 40).

TOLLS.

Tolls actually collected on vessels transiting the Canal during the year amounted to \$8,496,633.40. In addition, the sum of \$14,003.42 was collected for vessels that passed through the Canal during prior fiscal years, making the total amount collected \$8,510,636.82. Tolls earned amounted to \$8,516,469.80. Of this, the sum of \$19,836.40 was unpaid, being mainly charges on certain Government-operated vessels that may not be finally held liable for tolls. In addition, there remains unpaid from previous years the sum of \$20,711.08. The total differs from the amount shown on the operation and maintenance statement by the amount of refunds, account of overcharges during prior years (\$10,948.49). Under the ruling of the Attorney General, tolls on vessels with cargo or passengers are collected in accordance with the Panama Canal rules of measurement only in cases where the amount derived by multiplying the Panama Canal net tonnage by \$1.20 per ton is less than the amount ascertained by using the rate of \$1.25 and the net registered tonnage as defined by United States statutes. Had Panama Canal rules been applied in all cases the sum of \$9,955,754.32 would have been collected. The limitation, therefore, resulted in a loss to the Panama Canal during the past fiscal year of \$1,445,117.50, as compared with a loss of \$867,526.48 in 1919, \$1,083,111.69 in 1918, \$1,034,001.88 in 1917, and \$390,714.05 in 1916, or a loss to the Canal since the decision of the Attorney General was applied of \$4,820,471.60. This amount, plus the sum of \$10,948.49, which was the amount refunded during the year under the authority of the act of Congress of June 12, 1917, and \$214,951.12 refunded during previous years on account of the erroneous collections made prior to the ruling of the Attorney

General, and approximately \$63,533.03 still to be refunded, gives the total loss to the Canal and the United States Government as \$5,109,904.24. Vessels of American and foreign register have benefited since the opening of the Canal, under the rules of measurement now in force, as follows:

American vessels plying between American ports.....	\$237, 956. 85
Foreign vessels plying between American ports.....	67, 881. 50
American vessels plying between American ports and Canal ports.....	97, 956. 05
Foreign vessels plying between American ports and Canal ports.....	1, 325. 90
American vessels plying between American possessions and American ports.....	34, 908. 60
Foreign vessels plying between American possessions and American ports.....	43, 495. 75

The total saving in payment of tolls on all vessels engaged in American trade, as above defined, was \$483,524.65. Of this total, \$57,955.20 consisted of deck loads, \$56,864.40 of which were carried by American vessels and \$1,090.80 by foreign vessels. Vessels engaged in foreign trade, and especially vessels under foreign registry, have been the beneficiaries at a time when the United States has needed revenue from every legitimate source.

ACCOUNTING TO THE TREASURY FOR COLLECTIONS.

No examination of the collection accounts was made by employees from the offices of the Auditor for the War Department and the Comptroller of the Treasury as contemplated by section 3 of the sundry civil act approved March 3, 1915.

CANAL APPROPRIATIONS.

The Congress to June 30, 1920, appropriated for the Canal and fortifications thereof a total of \$467,431,257.41. Of this amount \$34,658,400.81 was for fortifications, \$2,250,000 to cover nine annual payments of \$250,000 each to the Republic of Panama for Canal Zone rights, and \$170,000 for regulating commerce and for the censorship of foreign mail during the fiscal year 1919. The sum of \$43,997,755.68 has been specifically appropriated for the operation and maintenance, sanitation, and civil government of The Panama Canal and Canal Zone. Of the amounts appropriated other than specifically for operation and maintenance, the sum of \$4,289,159 was charged against operation and maintenance to the end of the fiscal year 1915, while \$2,225,000 of the general appropriations for construction have been used under proper authority to pay for a part of the stock of material and supplies for the operation and maintenance of the Canal. Deducting from the total appropriations the amount appropriated for fortifications \$34,658,400.81; for Panama, \$2,250,000; for regulating commerce and censorship of mails, \$170,000; for operation and maintenance (including the amount of the stock of material and supplies), \$50,511,914.68, leaves \$379,840,941.92 appropriated for the construction of the Canal and its immediate adjuncts. This includes the appropriation for presenting the launch *Louise* to the French Government as a general expense of the construction of the Canal. Of the total appropriated for construction, \$4,329,898 for colliers and coal barges, \$2,093,190 for pier No. 6, Cristobal, \$300,000 for work on the colliers *Ulysses*

and *Achilles*, and \$720,000 for reboiling and repairing the steamships *Ancon* and *Cristobal*, were specifically exempted by law as a charge against the amount of the authorized bond issue. The sum of \$372,397,853.92 is left chargeable against the bond issue. The balance available for appropriation within the limit of the cost of the Canal and the authorized bond issue is \$2,825,302.08, the actual difference between the amount appropriated and the items which are exempted as a charge against the bond issue being increased by the appraised value of the American Legation Building, Panama, \$22,256, which was transferred to the Department of State. The amount appropriated for the support of the Canal during the fiscal year 1920, \$9,281,851 is not included in the above figures.

Miscellaneous receipts to June 30, 1920, amounted to \$42,176,261.22. Deducting tolls, \$33,303,581.67, Canal Zone revenues collected since July 1, 1915, \$691,747.26, profits on business operations, \$358,199.05, interest on the cost of public works in the cities of Panama and Colon and on bank balances, \$599,408.88, and miscellaneous collections, \$8,035.68, gives the amount repaid on the cost of construction as \$7,215,288.68. This includes the amount paid by the Panama Railroad for subsidies, dividends and interest, as the Canal would have obtained the benefit of these amounts in reduced rates if they had not been added to the expenses of the railroad. Deducting the amount repaid on the cost of construction and including available balances, there is left the sum of \$365,182,565.24 as the actual present cost of the Canal projects estimated for in 1908. This amount is reduced from year to year by receipts from the sale of construction material and equipment and by additional collections covering expenditures for waterworks, sewers, and pavements in the cities of Panama and Colon. The cost of the Canal as a commercial venture is also entitled to credit for the value of the buildings, public works, and equipment transferred to the Army, the Alaskan Engineering Commission, and to the State Department without any actual payment therefor. The appraised value of items so transferred is \$2,087,342.67, of which \$146,500 was the value of items constructed by the Canal Zone government. (See Tables Nos. 13 and 14.) The status of authorized bond issue is shown in Table No. 1. General ledger items are shown in Table No. 2.

CURRENT APPROPRIATIONS.

The cash balance of the current appropriations for operation and maintenance, sanitation, and civil government and for construction, on June 30, 1920, amounted to \$12,347,642.76. Including the amount of the accounts receivable and transfers of appropriations to be made in payment for work done and supplies furnished, the total of the cash and cash items was \$16,325,017.48. The liabilities immediately payable, including the amount to be paid the United States Shipping Board for the two coal barges, which are now in service, amounted to \$6,004,775.71. The additional ordinary obligations outstanding, viz, \$3,601,343.84 on outstanding orders, \$3,480,460.30 on unfilled requisitions, and \$2,234,701.77 on allotments for special work make a total of the regular obligations of \$15,321,281.62, and leave a balance of \$1,003,736.26. This balance is a great deal more than offset by the reserves for repairs (\$484,268.74)

and by the amount due employees for leaves earned (\$813,591.01), a large portion of both of which may be required at any time, and by the reserves for depreciation on equipment, \$2,442,029.86.

As stated last year, too much stress can not be given to the necessity of keeping the appropriations for Canal operation and maintenance on a continuing rather than on an annual basis, and to the maintenance of an adequate cash balance to carry on the business operations. Work for the Army and Navy has been done on a very large scale in the past and will continue to be done. Delays in payments seemingly can not be avoided. This throws a burden on Canal funds that must be recognized and provided for. The cash balance with which to operate can be provided by a special appropriation, or what is believed to be better and more in keeping with the law relative to the business operations of the Canal, by considering the reserves for depreciation as direct obligations against the appropriations for operation and maintenance. Until an amount equal to the reserves is retained as a part of the cash assets of the Canal, the entire amount appropriated each year must not be expended; the balance must be retained and must not be used as a reason for reducing the amount to be appropriated during the following year. Fluctuations in the value of stock on hand also directly affect the cash balance, and if the value of the stock falls below the amount authorized for investment in stock then the difference must be considered as a direct obligation chargeable to the appropriation at any given time.

OPERATION AND MAINTENANCE.

[Tables Nos. 4 and 5.]

The ordinary expenses for operation and maintenance of the Canal, including those of civil government and sanitation, amounted to \$6,548,272.43, as against \$6,112,194.77 expended in 1919, and \$5,920,342.94 expended in 1918. This does not include expenditures for additions and improvements amounting to over \$900,000. The expense of maintenance dredging increased from \$1,152,188.99 to \$1,611,359.78 due to the slides in Gaillard Cut. Operation expenditures show increases due to increased wages, also to the additional force required by increased traffic through the Canal. The civil government expenses show an increase of over \$100,000, the main increase being for schools and the police force. The expenses of the Washington office increased from \$327,798.14 to \$345,572.98, due to some extent to increased compensation following similar increases in other departments in the States. Expenses of the executive office increased from \$416,052.38 to \$513,791.17. The main causes were the creation of the bureau of shipping commissioner as a part of the department of operation and maintenance, and the transfer of all employees engaged in clubhouse activities to the force of the bureau of clubs and playgrounds. The overhead expenses charged to maintenance and operation amounted to \$3,324,167.10, as against \$3,382,167.30 charged the prior year. In the overhead expense accounts are included charges for civil government amounting to \$808,658.43, expenses for hospitals, quarantine, and sanitation amounting to \$662,349.90, and \$3,267,430.92 expended for administration, including expenses of the executive department, accounting department Washington office, operation and repairs of storehouses

and quarters, lighting of streets, operation and maintenance of sewer system and roads.

Offsetting the total expenses for operation and maintenance are the amounts earned as tolls for vessels transiting the Canal during the year—\$8,516,469.80, less refunds, \$10,948.49, and less bills canceled, \$12,438.75 (prior years), or \$8,493,082.56 (this amount differs from the amount actually collected from vessels transiting the Canal because of certain unpaid bills on Government operated vessels); the amounts collected as licenses and taxes, court fees and fines, \$153,102.88, and as profits on business operations, \$239,686.13, a total of \$8,885,871.57. The revenues earned in excess of current expenses amounted to \$2,387,599.14. The charges to operation and maintenance with minor exceptions do not include depreciation of plant and equipment. Interest on the capital investment is also excluded.

The expenditures charged to operation and maintenance to date amount to \$36,657,766.89, to offset which are the total revenues from tolls, civil government collections, and profits on business operations, amounting to \$34,426,675.28, which may be reduced by about \$64,000 when the balance of refunds of tolls erroneously collected is paid. Had Panama Canal tonnage rules been applied, there would be a surplus in revenues over expenses of \$2,600,000. It is evident that by June 30, 1921, the collections for tolls and other Canal revenues will exceed by one or more millions of dollars the total current expenses of the operation and maintenance of the Canal to that date, after which there should be an excess of \$5,000,000 or more each year.

BUSINESS OPERATIONS.

[Table No. 7.]

The total revenue derived from business operations, carried on with Panama Canal funds, amounted to \$14,705,371.82, as against a total of \$13,684,881.18 received during the prior fiscal year, an increase of $7\frac{1}{2}$ per cent over 1919, and $42\frac{1}{2}$ per cent over 1918. The cost of carrying on these operations during the last fiscal year amounted to \$14,465,685.69, leaving a net profit of \$239,686.13 to be covered into the Treasury as miscellaneous receipts under the Panama Canal act and the regular Panama Canal appropriation acts. The net profits for the fiscal year 1916 amounted to \$11,898.44; for 1917, \$39,427.66; for 1918 to \$6,159.56; and for 1919 to \$61,027.26. The result is due to the approved policy of making the charges in most cases so as to barely cover the cost. Shop work, work for the Panama Railroad, and other departments of the Government, and all services rendered for employees (and these are the major items) are performed at cost, except that both subsistence and hospital services rendered employees are consistently rendered at a loss. There was an increase in the work performed by the shops, including electrical work, from \$4,277,823.90 to \$5,301,273.65. The value of tug service increased from \$288,675.36 to \$401,144.61. Sales of water increased by \$20,000. The revenues from the use of the dry dock at Cristobal increased over \$15,000. The sales of fuel oil increased from \$1,161,573.74 to \$1,228,133.66. The increase in business operations at the Canal is shown by the increased numbers and amounts of formal bills as follows:

	Number of bills.	Amount.
1915.....	8,686	\$12,197,170.74
1916.....	12,754	11,786,187.91
1917.....	16,385	17,007,342.16
1918.....	22,070	20,887,460.60
1919.....	24,210	25,272,815.50
1920.....	28,825	28,654,731.44

In addition, Panama Railroad commissary bills increased from 10,733 amounting to \$3,459,038.28 in 1917, to 13,100 amounting to \$4,438,725.57 in 1918, to 13,949 amounting to \$5,249,707.46 in 1919, and to 12,237 amounting to \$6,533,471.27 in 1920. The regular Panama Railroad bills increased from 9,285 amounting to \$8,993,007.41 in 1917, to 9,652 amounting to \$10,282,388.24 in 1918, to 10,036 amounting to \$12,643,489.63 in 1919, and to 11,198 amounting to \$14,795,390.37 in 1920, or a total increase from 1917 to 1918 to 1919 and to 1920, in numbers from 36,404 to 44,822 to 48,195 and to 52,260 in bills, and amounts from \$29,459,387.85 to \$36,008,574.41 to \$43,166,012.59 and to \$49,983,593.28, respectively. In addition, many thousand memorandum bills were rendered for land rent, telephones, garage, electric work, and repairs.

MATERIAL AND SUPPLIES.

The value of material and supplies in storehouses on June 30, 1920, amounted to \$5,654,526.04 as compared with \$6,312,836.28 on June 30, 1919. In addition, the divisions had on hand for immediate use material to the value of \$546,618.22. Material issued during the year amounted to \$8,329,558.22 exclusive of that to the Panama Railroad Company. Material and supplies, including fuel oil, were sold for \$2,644,990.68. For the previous year, issues and sales amounted to \$7,967,563.30 and \$1,887,609.25, respectively. The reduction of almost \$1,000,000 in the value of the stock in the storehouses and in the hands of divisions has been reflected in an increased cash balance. (For further information see Tables Nos. 12, 56, and 57.)

CONSTRUCTION OF CANAL AND CAPITAL ADDITIONS.

[Table No. 8.]

The expenditures charged to the Canal construction accounts for work done during the year were small as compared with prior year charges, the total amounting to a little over \$1,000,000. The charges to capital additions covering expenditures for permanent improvements, the costs of which were payable from maintenance and operation appropriations, amounted to a little over \$900,000; the principal items chargeable to construction with unit costs where available were dredging inner harbor, Balboa, \$34,916.25, involving the removal of 63,050 cubic yards of material at an average division cost of \$0.4991 per cubic yard; of this material 84 per cent was earth and 16 per cent rock (see Table No. 23); sanitary fills and ditches, \$9,503.54; settlement of claims for private property within the Canal Zone, \$546,217.05; buildings, \$19,877.26, the main item being

the completion of Ancon Hospital buildings; the new garbage incinerator at Cristobal, \$115,873.52; and Pier No. 6, Cristobal, \$113,471.94. There were also transferred to the construction accounts about \$900,000 which had heretofore been tentatively charged in the capital addition accounts; the main items, with the approximate amounts involved were dredging Cristobal Harbor, \$130,000; extensions to the electric current system, \$233,000; fuel-oil plants, \$82,000; shops, \$186,000; work on locks, \$160,000; aids to navigation, \$53,000. There remains to be expended under construction appropriations \$2,329,898 for the two new coal barges; \$250,000 for work on the colliers *Ulysses* and *Achilles*; \$325,000 for dredging; and \$81,000 for the payment of land claims with certain other small amounts which make a total of a little over \$3,000,000. The main items of expenditure under capital additions were extension to the power and lighting system, \$84,858.56; addition to fuel-oil plant, \$90,219.50; new garages, \$20,425.56; fills, roads, water and sewer systems, New Cristobal, \$187,369.43; terminal storehouses and shop buildings, Cristobal piers, \$46,182.33; fenders, Miraflores locks, \$9,623.32; road, Balboa shops to Diablo, \$34,452.44; repairs to Docks 13 and 14, \$32,481.84; quarters for gold employees, \$183,000; quarters for silver employees, \$48,000; and miscellaneous, \$87,061.14.

MANUFACTURING PLANTS.

The new Gatun hydroelectric plant and the Miraflores steam electric power plant generated 55,300,094 kw. hours during the past year at an average cost of \$0.0094 per kw. (See Table No. 26.)

The Ancon-Balboa-Panama waterworks system produced 2,790,202,000 gallons of water at an average cost of \$0.0745 per thousand gallons. Of this amount 1,026,782,000 gallons were used in the city of Panama. The Gatun system produced 427,714,000 gallons of water at an average cost of \$0.1378 per thousand gallons. The Colon-Cristobal system produced 2,157,686,000 gallons at an average cost of \$0.0609 per thousand gallons. Of this amount 625,374,000 gallons were used in the city of Colon. (See Tables Nos. 27, 28, and 29.)

The sand and gravel reclaiming plant produced a total of 119,618 cubic yards. The average division cost of this sand and gravel was \$1.40 per cubic yard. (See Table No. 25.)

PUBLIC WORKS, PANAMA AND COLON.

Under the agreement with the Republic of Panama, which requires reimbursement within 50 years from July 1, 1907, for the expenditures incurred by the United States for the construction, operation, and maintenance of waterworks, sewers, and pavements in the cities of Panama and Colon, the expenditures for construction to June 30, 1920, in Panama have amounted to \$1,430,208.91, and in Colon to \$1,220,382.03, a total of \$2,650,590.94. The total expenditures for operation and maintenance were \$911,083.54 for Panama and \$798,127.58 for Colon. Besides being authorized to currently reimburse itself from water-rental collections for the expenses of operation and maintenance, the United States gradually liquidates the expenditures for construction by a quarterly charge equal to one-

quarter of the part of the capital cost ascertained by dividing the amount thereof by the number of years the contract has to run. In addition, the Republic of Panama pays interest at the rate of 2 per cent per annum on the capital cost balances and on the proportionate cost of waterworks in the Canal Zone used for supplying water to the two cities, based upon the quantity of water consumed. For the work in Panama, this interest has amounted to \$293,602.26; for the work in Colon, \$249,073.16; and for the proportionate cost of waterworks in the Canal Zone, \$123,991.09, a total of \$666,666.51. To liquidate the capital cost there has been paid to the United States, or is immediately due, the sum of \$563,442.21, leaving a balance unpaid of \$1,106,926.48 for the work in Panama, and \$980,-222.25 for the work in Colon, a total of \$2,087,148.73, payable in installments during the contract period. The amount which is payable immediately under the agreement is \$94,179.05, and is covered by bills for the difference between the current charges for the work plus the quarterly payments required and the amount collected as water rentals. The Panama Canal continues to maintain the pavements in the two cities under the temporary agreement reached at the beginning of the fiscal year 1918, whereby reimbursement is still obtained through the water-rental collections.

EXCHANGE OF PROPERTY WITH PANAMA RAILROAD COMPANY.

The exchange proposed in 1917 of certain property of the Panama Railroad Company which is either used by The Panama Canal or is a part of the general terminal facilities owned by The Panama Canal, for certain property of The Panama Canal used by the Panama Railroad Company, together with the cancellation of the notes standing against the Panama Railroad Company, still remains to be effected. It will very much improve the relationship of the two interests if this exchange is ultimately effected.

EXAMINATION OF PAY ROLLS.

There were 403,231 pay-roll items, 55,556 gold and 347,675 silver, audited prior to payment. Sixty-five errors, involving \$274.58, were discovered by the Auditor for the War Department upon final audit of Panama Canal rolls amounting to \$15,141,321.37. Only \$20.17 were collected from clerks responsible for the errors. The gross deductions on the rolls amounted to \$6,650,009.19, of which \$5,628,691.24 were for commissary books and \$657,175.70 for Victory loan notes and interest thereon, the balance being for miscellaneous purposes—silver rentals, Red Cross, hospital charges, etc. Numerous changes were required on the pay rolls because of the general increases in wages to silver employees effective July 1, 1919, and February 1, 1920, also on account of increases in the building trades effective July 1, August 1, and October 1, 1919, and February 1, April 1, and June 1, 1920. The pay rolls, both silver and gold, with almost no exception, are now written on the addressographs, as are the time books and pay receipts.

INSPECTION OF ACCOUNTS.

To examine the accounts of officers and employees charged with the collection, disbursement, and custody of Panama Canal and Panama Railroad funds, or with other funds which are held by such persons on account of their official positions, 347 examinations were made of the accounts of employees of The Panama Canal, while 164 were made of the accounts of the Panama Railroad Company. At the close of the year there were 116 Panama Canal and 49 Panama Railroad accounts subject to inspection.

TIME INSPECTION.

There were 10,442 gangs inspected during the year, involving the checking of 519,859 employees. Six hundred special reports were made by inspectors calling attention to errors of various kinds. The actual saving during the year on account of corrections made by the time inspection force is comparatively small—\$3,822.90—but the general benefit of the inspection force can not be questioned.

FREIGHT CLAIMS.

There were 2,851 new claims for losses or damage to freight received, the amount claimed approximating \$322,000. This is an increase of 683 claims and \$104,000 over the prior year. The sum of \$41,651.20 was paid in adjustment of claims assumed by the Panama Railroad operations on the Isthmus; in addition \$53,077.24 were charged against the steamship line accounts. This is an increase of over \$8,000 for the railroad and \$30,000 for the steamship line.

CLAIMS FOR DAMAGES TO VESSELS.

Two claims for damages to vessels passing through the locks, amounting to \$7,243.51, were settled in accordance with the provisions of section 5 of the Panama Canal act; also two claims, amounting to \$2,361.98, for damages done in the Canal outside of the locks. Damages to a number of vessels were repaired at an expense of \$5,179.12, making a total of \$14,784.61, all adjusted without recourse to the courts. The previous year the total payments and cost of repairs amounted to \$16,739.19.

BONDS OF EMPLOYEES.

The schedule bond of employees of The Panama Canal and Panama Railroad Company, executed to insure the faithful performance of their duties, was continued with the Maryland Casualty Co. The total liability for Panama Canal employees was \$430,000, and for Panama Railroad Company employees, \$381,000. No claim was made during the year against the surety company for defalcation of employees. The total cost for the year was about \$1,200.

COUPON BOOKS.

The strip coupons have been continued in use through the year. All books have been printed at the Panama Canal press, a new printing press having been especially constructed and installed for this purpose, with the resulting decided reduction in the cost of the books in spite of the heavy increase in the cost of paper and all other expenses connected with printing. Books to the value of \$5,627,605, being \$1,100,000 in excess of the amount issued during the preceding year, were issued to employees for pay-roll deduction. Books to the value of \$2,099,832.50 were sold for cash, the total for the year amounting to \$7,727,437.50, as against the total for the preceding year of \$6,510,997.50. There were also used during the year by silver employees meal tickets to the value of \$46,329.50, a reduction of \$21,000 from the amount used the preceding year. (For further details see Tables Nos. 37-39.)

CANAL ZONE ACCOUNTS.

The balances, unexpended in the old Canal Zone funds account, \$6,220.11, were deposited in the Treasury as miscellaneous receipts, as there were no further obligations outstanding against such items. The collections for licenses and taxes during the year amounted to \$15,354.05; court fees and fines \$27,694.45; postal receipts, \$109,117.48, with miscellaneous items amounting to \$57,210.07, a total of \$209,376.05. During the prior year the sum of \$136,876.29 was deposited. The cash balance of miscellaneous trust funds, which include clubhouse and money-order funds in the hands of the collector, have increased from \$683,085.95 on June 30, 1919, to \$780,757.96 on June 30, 1920. During the year 125,122 money orders, to the value of \$3,198,989.98, were issued, as against 140,618 to the value of \$3,108,678.27 during the previous year, or an increase of \$90,311.71. This increase was due to the fact that employees no longer invest savings in Liberty bonds. Since the establishment of the money-order business on the Isthmus, 2,454,002 orders have been issued to the value of \$57,524,064.81. There have been paid \$40,152,048.33 on money orders drawn on the United States. (See Tables Nos. 41-45.)

CLUBHOUSE ACCOUNTS.

The revenues derived from the operation of the various clubhouses amounted to \$427,118.67, as compared with \$463,409.39 received during the prior fiscal year. The expenditures amounted to \$452,600.34. Soda-fountain receipts amounted to \$132,237.49; cigars and candies, \$138,073.10; moving pictures, \$36,747.87. The items for soda fountain and cigar and candy accounts show a large decrease over the prior year's receipts, caused by the opening up of the Army and Navy Y. M. C. A.'s. The moving-picture receipts show an increase over the prior year, while the receipts from membership fees were reduced from \$808 to \$90, caused by the discontinuance of these fees. The cash balance on hand June 30, 1920, amounted to \$61,107. In addition there were commissary coupons, \$10,131.50, and outstanding accounts, \$6.44, making a grand total of cash and

cash items of \$71,244.94. The year's business operations resulted in a loss of \$15,197.14, reducing the surplus from \$78,021.25 to \$62,824.11. (See Tables Nos. 46-49.)

CLAIMS FOR INJURIES AND DEATHS.

On July 1, 1919, there were pending four death cases and 141 injury cases. Three of the death cases were approved for payment and one was disallowed on account of having no legal dependents. Sixteen of the injury cases were disallowed; the remainder, if the time lost exceeded three days, were approved for payment. During the past fiscal year there were reported 4,451 accidental injuries and 17 accidental deaths of employees, as against 3,308 injuries and 23 deaths during the preceding year. Compensation was allowed in 1,471 cases of injury and 3 cases of death. In 199 cases no compensation was allowed, the reasons being:

	Cases.
Injured person not an employee.....	1
Insufficient evidence to establish claim.....	73
Injury not sustained in performance of duty.....	29
Disability not the result of injury claimed.....	92
Failure to give notice of injury as required by act.....	1
Intention to cause injury to self or another.....	3

In three cases of death no dependents were found, and in one the death was not caused by the injury claimed. Ten death cases are pending. On account of injuries and deaths occurring during prior years, there were paid to employees for injuries \$17,705.17; to beneficiaries for deaths of employees \$3,946.67; to persons injured during the year there was paid the sum of \$25,123.68, and to beneficiaries of employees who died as result of injuries received in line of duty, \$549.83. The beneficiaries included 1 widow and 13 children. In addition there was paid to one person under the Executive order of March 20, 1914, the sum of \$1,073.95. Sixteen lump sums, averaging \$988, were paid to injured employees. Three lump sums, averaging \$510, were paid to beneficiaries of employees. Two monthly payments of compensation to beneficiaries were discontinued, one on account of death and the other on a finding of non-dependence.

On June 30, 1920, 35 beneficiaries, 1 widow, 31 children, and 3 parents were carried on the rolls for monthly payments. Thirteen former employees were being carried on the rolls on account of apparent disability, 7 of them being totally disabled and being paid the maximum compensation. The injury board, consisting of the chief health officer, the auditor, and the head of the department in which the employee was working at time of injury, met approximately once a month to determine the loss of earning capacity of injured employees, and the number of cases considered at each meeting varied from 5 to 13. Many claims were based on trivial injuries and were disposed of by referring the injured person to the head of his department or division for duty. Others involved considerable correspondence and personal interviews with the injured employee, his attorney, his diplomatic or consular representative, before any final disposition of the case could be made. In all cases of lump-sum payments the recipient was paid upon his departure from the Isthmus, except one widow who chose to remain here.

The payment of \$1,200 to five crippled inmates of Corozal farm was authorized upon their repatriation. Four of these persons have been paid and have left the Isthmus. The claim officer has conducted many investigations in injury and death cases not falling under the compensation act. Reports in 170 such cases, including reports of injuries to property, were received, many of which required extensive inquiries. These investigations have been made at the request and in cooperation with the counsel for The Panama Canal and Panama Railroad Company. The attention of the heads of departments and divisions has in many cases been called to dangerous places, with the result that many safeguards to life and body have been installed.

The policy relative to making payments was modified somewhat during the year with the result that fewer lump-sum payments were made. The payment of compensation in monthly installments, especially to children, was deemed desirable. It has been found that the majority of gold employees who were for a short period of time disabled are unwilling to accept compensation at the maximum rate—\$66.67 per month. One hundred and eleven of these employees had the time lost by them from work charged against their leave, 72 only accepting payment under the compensation act. (See Tables Nos. 50-55.)

OPERATIONS WITH PANAMA RAILROAD COMPANY'S FUNDS.

The accounts of the railroad company show the results of the operations of the railroad proper, harbor terminals, coaling plants, stables, baggage transfer, and motor-car machine shop carried on under the direction of the superintendent of the railroad; of the telephone system under the electrical engineer of The Panama Canal; of renting of lands and buildings under the land agent and special attorney; of the Hotel Washington, commissaries, plantations, cattle, poultry, hog, and dairy farms under the chief quartermaster of The Panama Canal.

A reclassification was made during the year of all Panama Railroad assets on the Isthmus, showing in more complete detail the principal items of this property, also the reserves for depreciation, which was set up under a corresponding classification. New accounts were opened for revenues derived from coal and from beef cattle, so as to show the sales to various interests, such as commercial, Panama Canal, United States Army and Navy, individuals and companies, etc. A revised classification of accounts was prepared and issued in pamphlet form.

RAILROAD, HARBOR TERMINALS, ETC.

Due to the increase in operating costs, the net revenue of the railroad proper decreased \$165,010.65 as compared with the prior year, leaving a profit of only \$20,868.77.

The net revenues from harbor terminal operations amounted to \$136,718.19, a decrease of \$205,981.28, as compared with the previous year. Gross revenues increased \$82,386.62 but the gross expenses increased \$288,367.90.

The gross receipts from coal sold were \$7,243,559.55, and the value of this coal, including operating expenses, was \$6,274,147.44. The

resulting profit for the year was \$989,402.11 as compared with \$810,379.83 for the previous year.

The motor busses were continued in operation to the end of July only, resulting in a loss of \$1,328.24. The Panama stables, which were leased during the preceding year for a monthly rental, show a net revenue return of \$965.54 above the cost of extraordinary repairs and depreciation, against a loss of \$5,974.38 the previous year when the stables were operated by the Panama Railroad. The operation of Colon stables resulted in a loss of \$2,436.82. Baggage transfer service operated at a profit of \$4,459.28, an increase of \$3,307.08 over the previous year. The loss in operating motor-car machine shop decreased from \$2,575.83 to \$1,606.93 for the year ending June 30, 1920. The cost of operating the telephone system was \$17,534.60 in excess of revenues.

The net revenue from rental of land was \$104,188.40 and buildings \$4,093.90, an increase over the previous year of \$4,201.25. The operation of the Hotel Washington shows a profit for the year of \$24,046.01, an increase in net revenue of \$12,656.77 over the previous year. Of the amount of the net revenue for the last two years \$30,000 was set up as a reserve for depreciation of building, no charge having been made heretofore on account of the hotel operating at a loss prior to the fiscal year ended June 30, 1919.

FARM INDUSTRIES.

The gross revenue from plantation products shows an increase of \$12,948.28 over last year, and the operating expenses a decrease of \$17,810.51, resulting in a loss for the year, however, of \$16,276.60, compared with a loss of \$47,035.39 for the corresponding period of the previous year.

Poultry farm.—The revenue derived from the sale of poultry and eggs during the year was \$18,924.24, the cost of which was \$28,035.19 in excess of the revenue.

Hog farm.—The cost of operating the hog farm was \$78,196.34. The receipts from hogs sold and turned into the abattoir were \$159,460.71, the cost of which was \$175,682.55, including operating expenses, resulting in a loss for the year of \$16,221.84.

Dairy farm.—The operating expenses of the dairy farm were \$83,074.39 and the products disposed of, consisting of milk, cream, and calves, amounted to \$78,697.74, an increase in gross receipts over last year of \$32,729.73, resulting in a loss of \$6,787.29, a decrease in loss compared with the previous year of \$35,594.61.

Cattle.—To provide for the increasing demand for beef cattle the commercial steamer *Middlebury* was chartered from the United States Shipping Board, and after being refitted at Balboa shops for this service the steamer was used part of the year for transporting cattle from Colombia in conjunction with the steamers *Culebra* and *Caribbean*. There were 25,241 head of cattle imported by the three steamers during the year, and a total of 25,222 head was sold or turned in to the abattoir for \$2,136,932.05. The resulting loss on cattle operations, \$189,973.39, was in reality due to the breaking of the agreement by the Army to purchase beef as the much larger importation of cattle that was expected would have enabled the spreading of the expense over a larger number of head of cattle.

The cost of refitting, maintenance, and operation of the cattle steamers amounted to \$706,826.07, of which the sum of \$363,292.25 covered the extraordinary expenses of refitting the steamship *Middlebury* for the cattle service, the expense of overhauling and refitting the steamship *Culebra* as a dredge, and extensive repairs on the steamship *Caribbean*.

COMMISSARY.

Gross receipts from the sale of commissary supplies amounted to \$12,407,421.06 as compared with \$11,237,646.33 last year. Supplies were purchased to the amount of \$10,190,983.14, including \$2,044,035.16 for cattle, poultry, and hogs purchased on the Isthmus. The net profit amounted to \$276,093.40 as compared with \$267,282.07 last year, a very small amount when compared with the \$10,000,000 investment in supplies, plant, and circulating funds. The profits on the steamship sales amounted to more than this sum. The value of supplies on hand June 30, 1920, was \$2,638,715.72.

GENERAL.

The result of all operation of the Panama Railroad on the Isthmus shows a net revenue of \$1,069,472.78, a decrease of \$333,228.38 for the corresponding period last year. During the present year \$2,834,233.08, representing completed improvements, were added to the capital account, including \$74,254.17 transferred from The Panama Canal. In addition to this there remains authorized for improvements \$1,907,631.84, of which \$1,111,892.10 were expended up to June 30, 1920. The principal items authorized and under construction are railroad buildings, \$33,200; railroad passenger equipment, \$124,000; roadways and track yards at Cristobal pier, \$65,000; commissary plants and stores, \$152,000; new Colon fill, Mount Hope, silver townsite, and other real estate improvements, \$1,189,000; new stables, Colon, \$142,000; dredging basin for equipment at Cristobal coaling plant, \$153,000.

Detailed statements of revenue, expenses, and statistics of all railroad industries, including steamship line, will appear in the regular railroad annual report. Essential data only are contained herein to cover in a general way all the operations of the railroad on the Isthmus.

Respectfully submitted.

H. A. A. SMITH,
Auditor, The Panama Canal.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal, Balboa Heights, Canal Zone.

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THE PANAMA CANAL, FOR THE FISCAL YEAR 1920.

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THE PANAMA CANAL.

TABLE NO. 1—*Status of authorized bond issue.*

Authorized bond issue.....		\$375,200.90 .00
Appropriations by Congress to June 30, 1920.....	\$467,431,257.41	
Less appropriations for—		
Fortifications.....	\$34,658,400.81	
Annual payment to Republic of Panama.....	2,250,000.00	
Maintenance, operation, sanitation, and civil government of Canal, and increased compensation.....	43,997,755.68	
Regulation of commerce.....	50,000.00	
Censorship of foreign mails.....	120,000.00	
	<u>81,076,156.49</u>	
Appropriated for Canal construction.....	386,355,100.92	
Less amount exempted by law—		
2 colliers.....	2,000,000.00	
2 barges.....	2,329,898.00	
Dock No. 6, Cristobal.....	2,093,190.00	
Equipping colliers Ulysses and Achilles.....	250,000.00	
Covering unprotected surfaces of colliers.....	50,000.00	
Repairs to steamships Ancon and Cristobal, to June 30, 1915.....	720,000.00	
Expended for operation and maintenance of Canal.....	4,289,159.00	
Stock of material and supplies for operation and maintenance of Canal.....	<u>2,225,000.00</u>	
	<u>13,957,247.00</u>	
		<u>372,397,853.92</u>
Balance available for appropriation after June 30, 1920, within limit of cost of Canal and authorized bond issue.....		2,803,046.08
Appraised value of American Legation building in the city of Panama, exempted from charge to bond issue, act of July 1, 1916.....		<u>22,256.00</u>
Balance available for appropriation within the limit of cost of Canal and authorized bond issue.....		2,825,302.08
Amount appropriated, charged to bond issue.....		<u>372,397,853.92</u>
Amount re-aid to construction appropriation, account of waterworks, sewers, and pavements, Panama and Colon.....		<u>396,956.06</u>
Expended or available for expenditure.....		<u>372,794,809.98</u>

CLASSIFIED STATEMENT.

	Expended to June 30, 1920.	Unexpended allotments.	Total.
<i>Construction of Canal.</i>			
Prism excavation.....	\$137,190,492.93	\$147,400.00	\$137,337,892.93
Locks.....	74,515,978.56		74,515,978.56
Dams and spillways.....	17,771,615.81		17,771,615.81
Breakwaters.....	9,062,077.94		9,062,077.94
Aids to navigation.....	<u>868,619.33</u>	<u>11,000.00</u>	<u>879,619.33</u>
<i>Auxiliary works.</i>			
Electric power and transmission system.....	6,140,391.04		6,140,391.04
Coaling stations.....	5,964,365.94		5,964,365.94
Fuel-oil plants.....	704,239.69		704,239.69
Dry docks.....	3,613,030.42		3,613,030.42
Wharves, piers, and docks (exclusive of Dock 6).....	3,314,854.70		3,314,854.70
Playgrounds.....	54,474.41		54,474.41
Landscape improvements.....	<u>34,847.85</u>		<u>34,847.85</u>
Water and sewer systems and roads.....	4,615,798.67		4,615,798.67
Sanitary fills and ditches.....	793,980.34		793,980.34
Townsites.....	923,338.07		923,338.07
Improvements Cristobal Harbor.....	162,619.80	72,600.00	235,219.80
Dredging inner harbor and entrance basin.....	3,550,141.96	<u>106,700.00</u>	<u>3,656,841.96</u>
Preparatory work Balboa terminal.....	1,808,921.65		1,808,921.65
Floating caisson.....	<u>347,868.15</u>		<u>347,868.15</u>
<i>Miscellaneous items.</i>			
Real estate.....	3,729,059.30	81,473.40	3,810,532.70
Purchase from Panama Canal Co.....	38,721,690.16		38,721,690.16
Investment—Panama Railroad stock.....	155,818.24		155,818.24
Concessions from Republic of Panama.....	10,000,000.00		10,000,000.00
Relocation Panama Railroad.....	9,890,626.46		9,890,626.46
Buildings.....	<u>16,132,633.73</u>	<u>8,800.00</u>	<u>16,141,433.73</u>
Total.....	<u>349,977,485.15</u>	<u>427,973.40</u>	<u>350,405,458.55</u>

TABLE NO. 1.—*Status of authorized bond issue—Continued.*

CLASSIFIED STATEMENT—Continued.

	Expended to June 30, 1920.	Unexpended allotments.	Totals.
<i>Miscellaneous items—Continued.</i>			
Public works in the cities of Panama and Colon.....	\$2,479,522.00	.....	\$2,479,522.00
Assets transferred to other departments of the Government Equipment and property operated by the Panama Railroad.....	2,087,342.67	.....	2,087,342.67
Less Panama Railroad property trans- ferred to Canal construction.....	\$2,168,198.18		
	765,317.32		
	1,402,880.86	.....	1,402,880.86
Reequipment loan to Panama Railroad.....	1,399,114.61	.....	1,399,114.61
First mortgage bond loan to Panama Railroad.....	1,848,217.50	.....	1,848,217.50
Launch Louise.....	13,500.00	.....	13,500.00
Equipment, material, and supplies.....	7,943,633.49	.....	7,943,633.49
Miscellaneous receipts credited to assets.....	5,215,140.30	.....	5,215,140.30
Total.....	372,366,836.58	\$427,973.40	372,794,809.98

TABLE NO. 2.—*General ledger items, June 30, 1920.*

DEBITS.		CREDITS.	
Cash in hands of fiscal officers.....	\$4,336,652.83	Accounts payable.....	\$3,729,454.58
Appropriation balances, subject to requisition.....	13,744,224.28	Trust funds and security deposits..	233,947.59
Accounts receivable.....	3,267,378.64	Miscellaneous receipts not deposited in United States Treasury (Table No. 9).....	522,177.52
Material and supplies (Table No. 12)	5,871,704.48	Panama Railroad property operated by Panama Canal (Table No. 16).....	842,468.60
Reequipment loans to Panama Railroad Company.....	1,399,114.61	Unclassified credits.....	302,441.75
First mortgage bond loan to Pana- ma Railroad Company.....	1,848,217.50	Reserves (Table No. 17).....	3,739,889.61
Public works in Panama and Colon	2,650,590.94	Assets received from Canal Zone Government (Table No. 13).....	544,792.37
Construction of Canal (Table No. 8)	352,065,542.89	Assets received from United States Army.....	183,724.99
Capital additions (Table No. 8).....	2,101,878.55	Reimbursements account public works in Panama and Colon, re- paid to appropriations.....	396,956.06
Equipment (Table No. 10).....	9,805,232.82	Appropriations by Congress (Table No. 3).....	467,431,257.41
Work in progress (Table No. 11)....	937,962.45		
Panama Canal property operated by Panama Railroad Company (Table No. 15).....	2,168,198.18		
Assets received from Canal Zone Government.....	364,212.50		
Assets received from United States Army.....	175,258.99		
Fortifications.....	31,008,728.94		
Presentation of launch Louise to French Government.....	13,500.00		
Property transferred to other de- partments United States Gov- ernment (Table No. 14).....	2,087,342.67		
Miscellaneous receipts credited to assets.....	5,215,140.30		
Annual payments to Republic of Panama.....	2,000,000.00		
Operation and maintenance of Canal (Table No. 4).....	36,657,766.89		
Unclassified expenses.....	209,462.02		
Total.....	477,927,110.48	Total.....	477,927,110.48

TABLE NO. 3.—*Statement of appropriations by Congress.*

Canal rights from French company (act of June 28, 1902).....	\$40,000,000.00
Canal Zone rights from Republic of Panama (act of Apr. 28, 1904).....	10,000,000.00
Canal connecting Atlantic and Pacific Oceans:	
Act of June 28, 1902.....	\$10,000,000.00
Act of Dec. 21, 1905.....	11,000,000.00
	21,000,000.00
Deficiency for fiscal year 1906 (act of Feb. 27, 1906):	
Miscellaneous material purchases in United States.....	1,000,000.00
Miscellaneous material purchases on Isthmus.....	400,000.00
Payments to Panama Railroad Company.....	200,000.00
Isthmus pay rolls.....	2,100,000.00
Salaries and services in the United States.....	75,000.00
New equipment purchases.....	1,565,786.00
Reequipment of Panama Railroad.....	650,000.00
	5,990,786.00

TABLE NO. 3.—*Statement of appropriations by Congress—Continued.*

Classified appropriations, 1907-1920:		
Expenses in the United States—		
Salaries.....	\$1,476,056.33	
Incidental expenses.....	583,179.36	
		\$2,059,235.69
Construction and engineering—		
Pay of officers and employees.....	29,443,212.00	
Pay of skilled and unskilled labor.....	101,809,961.00	
Miscellaneous material purchases, etc.....	109,881,514.24	
Incidental expenses on Isthmus.....	6,640,250.00	
		247,774,937.24
Civil administration—		
Pay of officers and employees.....	4,507,000.00	
Pay of skilled and unskilled laborers.....	191,000.00	
Material and expenses.....	1,178,209.00	
		5,876,200.00
Sanitary department—		
Pay of officers and employees.....	5,391,000.00	
Pay of skilled and unskilled laborers.....	3,036,968.00	
Material and expenses.....	5,662,367.15	
		14,09,335.15
Reequipment of Panama Railroad.....		4,180,000.00
Relocation of Panama Railroad.....		7,815,000.00
Redemption of first-mortgage bonds of Panama Railroad Company.....		2,298,367.50
Sanitation in cities of Panama and Colon.....		800,000.00
Survey of lands, Canal Zone.....		75,000.00
Relief of Pembroke B. Benton for injuries.....		10,000.00
Construction and equipment.....		24,328,088.00
Private acts for relief—		
Elizabeth G. Martin, June 17, 1910.....	1,200.00	
Marcellus Troxell, Jan. 13, 1911.....	1,500.00	
W. L. Miles, Feb. 13, 1911.....	1,704.18	
Chas. A. Caswell, Mar. 2, 1911.....	1,053.00	
Heirs of Robert S. Gill, July 3, 1912.....	2,520.00	
Douglas B. Thompson, July 3, 1912.....	1,500.00	
Alleandra Comba, July 10, 1912.....	500.00	
Peter Wigginton, Feb. 7, 1913.....	500.00	
Raymond R. Ridenous, Feb. 7, 1913.....	500.00	
Heirs of Charles B. Stump, Feb. 7, 1913.....	1,500.00	
Parents of Edward Maher, Feb. 18, 1913.....	1,980.00	
Oscar F. Lackey, Feb. 18, 1913.....	1,500.00	
Pedro Sanchez, Feb. 18, 1913.....	2,000.00	
John H. Cole, Feb. 18, 1913.....	1,951.38	
Robert Cozen, Feb. 18, 1913.....	1,500.00	
Wife of William Goodlay, July 17, 1914.....	1,000.00	
John Burrows, Feb. 27, 1915.....	1,433.33	
F. W. Theodore Schroeter, Mar. 3, 1915.....	1,397.66	
L. V. Thomas, Mar. 3, 1915.....	1,680.00	
Joseph A. Buckholt, Aug. 4, 1916.....	3,000.00	
Olaf Nelson, Aug. 8, 1916.....	1,200.00	
		31,122.55
Judgments of the Court of Claims, War—		
Act of Aug. 26, 1912.....	196.45	
Act of Mar. 4, 1913.....	900.00	
Act of July 29, 1914.....	905.38	
Act of Feb. 28, 1916.....	1,000.00	
Act of Sept. 8, 1916.....	2,537.20	
		5,539.03
Judgment, United States Court (act of Apr. 6, 1914).....		9,489.76
Presenting steam launch <i>Louise</i> to French Government (act of Aug. 25, 1914).....		6,099.00
Total for Canal construction, rights, etc., to June 30, 1920.....		386,355,100.92
Fortifications:		
Aeronautic stations.....	\$250,000.00	
Aviation seacoast defenses.....	500,000.00	
Armament of fortifications.....	14,256,786.17	
Army quarters, storehouses, etc.....	8,223,069.70	
Building and materials.....	57,375.00	
Cantonment construction.....	500,000.00	
Causeway.....	150,000.00	
Construction of sea walls and embankments.....	63,600.00	
Electric light and power plants.....	301,631.00	
Field fortifications and camps.....	394,350.00	
Fire control.....	976,190.15	
Land for military purposes.....	50,000.00	
Land defenses.....	45,100.00	
Maintenance of clearings and trails.....	176,900.00	
Maintenance, etc., of fire-control installations.....	45,000.00	
Maintenance of searchlights and electric power equipment.....	57,500.00	
Ordnance depot.....	652,400.00	
Preservation and repair of fortifications.....	99,400.00	
Protecting Panama Canal and structures.....	450,000.00	
Re-serve equipment for fortifications.....	57,500.00	
Sanitary clearing, filling, etc.....	210,000.00	
Seacoast batteries.....	6,447,500.00	
Searchlights for seacoast fortifications.....	601,840.00	
Sites for seacoast fortifications.....	155,000.00	

TABLE No. 3.—Statement of appropriations by Congress—Continued.

Fortifications—Continued.				
Submarine mines.....		\$668,316.00		
Submarine mine structures.....		322,270.00		
Submarine base.....		1,652,625.00		
Surveys.....		62,000.00		
Less amounts transferred to United States Treasury surplus fund:				\$37,425,683.02
Armament of fortifications.....	\$2,214,000.00			
Sea walls and embankments.....	3,000.00			
Submarine mines.....	215,982.21			
Submarine mines—structures.....	15,200.00			
Ordnance depot.....	260,000.00			
		2,767,282.21	34,658,400.81	
Annual payment to Republic of Panama:				
Act of Mar. 4, 1913.....		\$250,000.00		
Act of Apr. 6, 1914.....		250,000.00		
Act of Jan. 25, 1915.....		250,000.00		
Act of Feb. 28, 1916.....		250,000.00		
Act of July 1, 1916.....		250,000.00		
Act of Mar. 3, 1917.....		250,000.00		
Act of Apr. 15, 1918.....		250,000.00		
Act of Apr. 15, 1919.....		250,000.00		
Act of June 4, 1920.....		250,000.00		
			2,250,000.00	
Regulating commerce, act of May 20, 1918.....		50,000.00		
Censorship of foreign mails, act of May 20, 1918.....		120,000.00		
			170,000.00	
Maintenance and operation of Canal:				
Maintenance and operation, Panama Canal.....		36,497,939.00		
Sanitation, Canal Zone, Panama Canal.....		4,000,000.00		
Civil government, Panama Canal and Canal Zone.....		3,442,000.00		
Increases of compensation, Panama Canal.....		57,816.68		
			43,997,755.68	
Total appropriation by Congress to June 30, 1920.....				467,431,257.41

DETAIL OF ACTS FOR MAINTENANCE AND OPERATION, SANITATION, CIVIL GOVERNMENT, AND CONSTRUCTION AND EQUIPMENT.

	Maintenance and operation.	Sanitation Canal Zone.	Civil government Panama Canal, Canal Zone.	Total.	Construction and equipment.
Act of Mar. 3, 1915.....	\$5,200,000.00	\$700,000.00	\$540,000.00	\$6,440,000.00	\$10,500,000.00
Act of July 1, 1916.....	5,750,000.00	700,000.00	600,000.00	7,050,000.00	9,750,000.00
Act of June 12, 1917.....	9,000,000.00	700,000.00	700,000.00	10,400,000.00	2,755,000.00
Act of Mar. 28, 1918.....					593,190.00
Act of June 4, 1918.....		150,000.00		150,000.00	
Act of July 1, 1918.....	9,000,000.00	900,000.00	750,000.00	10,650,000.00	
Act of July 19, 1919.....	7,547,939.00	850,000.00	702,000.00	9,099,939.00	729,898.00
Act of Nov. 4, 1919.....			150,000.00	150,000.00	
Increase of compensation Panama Canal, 1918, act of July 12, 1917.....	10,006.22			10,006.22	
Increase of compensation Panama Canal, 1919, act of July 3, 1918.....	16,000.00			16,000.00	
Increase of compensation Panama Canal, 1920, Act of Mar. 1, 1919.....	26,810.46			26,810.46	
Increase of compensation Panama Canal, 1920, act of July 19, 1919.....	5,000.00			5,000.00	
Total.....	36,555,755.68	4,000,000.00	3,442,000.00	43,997,755.68	24,328,088.00
Amount appropriated for construction but used for maintenance and operation and not chargeable against authorized bonds, etc. (act of Aug. 1, 1914, sec. 12):					
Maintenance and operation prior to July 1, 1915.....				4,289,159.00	
Stock of material for maintenance and operation.....				2,225,000.00	
Total for maintenance and operation.....				50,511,914.68	
Act of June 5, 1920.....	7,531,851.00	850,000.00	900,000.00	9,281,851.00	

TABLE No. 4.—Panama Canal operation and maintenance to June 30, 1920.

	Fiscal year 1919.	Fiscal year 1920.	Total to date.
Marine division:			
Admeasurement of vessels.....	\$21,650.91	\$31,385.91	\$101,536.06
Local inspection.....	4,104.76	7,292.82	28,607.82
Aids to navigation.....	98,857.28	122,794.31	510,051.30
Pilotage.....	128,416.96	188,535.36	619,525.44
Operation of harbor tugs—balance.....	74,343.04	58,555.45	296,963.12
Operation of port captain's office—balance.....	53,800.48	47,999.85	164,896.78
Assisting vessels through cut.....		7,788.60	13,906.63
Total marine division.....	381,173.43	464,352.31	1,735,487.15
Locks, operation and maintenance:			
Gatun locks—			
Superintendence.....	28,748.49	29,154.46	131,763.16
Operation.....	155,566.39	200,021.35	780,099.45
Maintenance.....	142,643.16	143,849.71	878,710.39
Total Gatun locks.....	326,958.04	373,025.52	1,790,573.00
Gatun spillway.....	6,226.22	6,535.37	76,131.88
Pedro Miguel locks:			
Superintendence.....	22,429.48	19,620.70	112,156.85
Operation.....	156,080.69	174,494.38	617,347.67
Maintenance.....	53,027.12	84,434.88	533,850.85
Total Pedro Miguel locks.....	231,537.29	278,549.96	1,263,355.37
Pedro Miguel dams.....			168.96
Miraflores locks:			
Superintendence.....	17,613.67	19,731.61	115,755.09
Operation.....	170,423.13	190,935.95	782,603.61
Maintenance.....	123,593.92	113,354.13	662,450.42
Total Miraflores locks.....	311,630.72	324,021.69	1,560,809.12
Miraflores spillway and east dam.....	753.68	1,323.49	18,719.86
Miraflores west dam—maintenance.....			832.37
Total lock operation and maintenance.....	877,105.95	983,456.03	4,710,590.56
Dredging:			
Atlantic entrance.....	6,868.56	9,017.14	198,369.28
Gatun Lake.....	12,530.77	6,293.82	19,267.47
Gaillard Cut.....	684,563.67	1,116,835.70	11,016,556.74
Miraflores Lake.....		23.95	85,301.91
Pacific entrance.....	448,225.99	290,835.16	1,166,625.78
Pacific Inner Harbor.....		188,354.01	188,354.01
Total dredging.....	1,152,188.99	1,611,359.78	12,674,475.19
Gatun dam, maintenance.....	17,707.93	21,631.28	132,435.07
Removal of floating obstructions.....	22,578.72	33,063.09	166,290.75
Gatun-N. indi levee, maintenance.....			31,326.04
Coion west breakwater, maintenance.....			81,523.46
Naos Island breakwater, maintenance.....			14,193.55
Damage to vessels in locks.....	5,789.70	7,243.51	19,112.44
Damage to vessels in Canal.....	10,949.49	7,541.10	46,249.66
Operation of floating derricks.....	77,591.81	46,874.32	577,247.57
Maintenance of transportation trucks.....	55,022.49	46,127.42	266,104.34
Dry excavation, Río Grande.....			37,606.99
Shop expense, Balboa, balance.....			19,158.55
Capital losses.....	108,108.69	1,363.95	129,095.89
Capital replacements.....	21,810.27	1,092.54	22,902.81
Loss on business operations.....			61,823.17
Total operation and maintenance.....	2,730,027.47	3,224,105.33	20,723,423.19
Proportion of overhead expenses.....	3,382,167.30	3,324,167.10	15,934,343.70
Total.....	6,112,194.77	6,548,272.43	36,657,766.89
Revenues:			
Tolls.....	6,156,118.95	8,493,082.56	33,303,581.67
Interest, licenses, taxes, fees, fines, etc.....	136,870.77	203,102.88	764,894.56
Profit on business operations.....	61,027.26	239,686.13	358,199.05
Total revenues.....	6,354,016.98	8,935,871.57	34,426,675.28
Revenues in excess of expenses.....	241,822.21	2,387,599.14	
Expenses in excess of revenues earned.....			2,231,091.61

TABLE NO. 5.—*Comparison of current expenses of operation and maintenance with current revenues, by years, 1914 to 1920.*

Fiscal year.	Maintenance and operation include proportion of overhead.	Revenues.	Revenues in excess of expenses.	Expenses in excess of revenues.	Excess of revenues over expenses to date.	Excess of expenses over revenues to date.
1914.....	\$166,030.91	\$14,618.68		\$151,412.23		\$151,412.23
1915.....	4,123,128.09	4,343,383.69	\$220,255.60		\$68,843.37	
1916.....	6,999,750.15	2,558,542.38		4,441,207.77		4,519,177.92
1917.....	6,788,047.67	5,808,398.70		979,648.90		5,352,013.30
1918.....	5,927,342.94	6,411,843.28	491,500.34			4,860,512.96
1919.....	6,112,194.77	6,354,016.98	241,822.21			4,618,690.75
1920.....	6,548,272.43	8,935,871.57	2,387,599.14			2,231,091.61
Total.....	36,657,766.89	34,426,675.28	3,341,177.29	5,572,268.90		2,231,091.61

TABLE NO. 6.—*Statement of overhead expenses, fiscal year 1920.*

	Fiscal year 1919.	Fiscal year 1920.
Civil government:		
Civil affairs—		
Administration.....	\$13,086.07	\$5,339.91
Posts.....	165,192.64	171,516.54
Customs.....	57,453.21	36,258.16
Estates.....	82.03	2,731.25
Total civil affairs.....	235,813.95	215,845.86
Schools.....	157,380.02	170,481.42
Fire protection.....	81,147.93	91,063.58
Police and prisons.....	293,498.08	335,436.66
District courts.....	17,588.52	22,910.51
Magistrate courts.....	12,551.49	14,535.07
District attorney.....	6,877.77	7,975.22
Canal Zone marshal.....	8,069.16	8,260.01
Municipal expenses.....	43.62	44.21
Total civil government.....	805,967.54	866,552.54
Charged to other interests.....	98,372.23	57,894.11
Amount apportioned.....	707,595.31	808,658.43
Health department:		
Administration.....	21,510.68	22,291.37
Medical storeroom.....	16,242.98	15,349.41
Ancon Hospital.....	477,694.53	578,439.70
Colon Hospital.....	82,128.85	99,938.44
Santo Tomas Hospital.....	14,792.00	13,566.13
Palo Seco Lepet Asylum.....	33,091.52	35,836.89
Corozal Farm and Insane Asylum.....	117,046.58	125,494.16
Other hospitals and dispensaries.....	35,491.14	44,875.37
Quarantine service.....	64,850.55	90,388.63
Sanitation—		
Panama.....	67,308.05	70,768.60
Colon.....	57,734.72	59,668.00
Canal Zone.....	161,505.57	143,980.52
Street cleaning and disposal of garbage—		
Panama.....	73,004.73	87,328.36
Colon.....	37,182.98	50,703.59
Total health department.....	1,251,584.88	1,438,629.17
Charged to other interests.....	605,249.42	776,279.27
Amount apportioned.....	646,335.46	662,349.90

TABLE NO. 6.—Statement of overhead expenses, fiscal year 1920—Continued.

	Fiscal year 1919.	Fiscal year 1920.
Supply department:		
Maintenance and care of Administration Building	\$33,186.97	\$40,064.39
Operation of storehouses	526,592.10	713,528.09
Repairs to storehouses	10,961.94	2,755.79
Handling freight on docks	4,638.30	16,464.01
Operation of quarters	825,009.58	557,835.67
Material stock losses	57,619.39	53,577.85
Repairs to quarters	314,708.62	374,194.09
Inventory adjustments	¹ 85,157.71	¹ 9,633.35
Repairs to other buildings	6,283.16	1,302.22
United States bills, adjustments	¹ 33,086.35	¹ 15,518.40
Ancon nursery	5,208.03	5,229.71
Total	1,665,933.03	1,739,800.07
Charged to other interests	202,902.59	280,323.06
Amount apportioned	1,463,030.44	1,459,477.01
Accounting department:		
Accounting office	378,049.76	494,090.11
Paymaster's office	50,290.35	52,430.83
Collector's office	43,945.32	43,243.22
Total	472,276.43	499,764.16
Charged to other interests	167,266.73	175,127.53
Amount apportioned	305,009.70	324,636.63
Washington office:		
Assistant auditor's office	42,261.78	41,819.03
Disbursing clerk's office	12,164.76	11,928.65
General bureau	67,098.89	70,388.71
Purchasing expenses	213,107.31	222,892.63
Total	334,632.74	347,009.02
Charged to other interests	6,834.00	1,436.04
Amount apportioned	327,798.14	345,572.98
Miscellaneous:		
Transportation of employees on Isthmus	141,300.00	141,603.68
Recruiting and repatriating	48,857.31	51,554.96
Compensation to injured employees	1,710.88	1,073.95
Land office	10,175.68	13,377.22
Special attorney	8,584.21	11,631.15
Payments to deported alien cripples	3,350.00	1,200.00
Total	213,978.08	219,839.96
Charged to other interests	19,084.21	20,030.15
Amount apportioned	194,893.87	199,809.81
Administration:		
Executive office—		
Executive	47,404.74	44,161.93
Miscellaneous bureaus—		
Correspondence	45,941.17	39,615.19
Record bureau	51,255.53	57,527.82
Personnel bureau	27,667.22	29,293.94
Property and requisition bureau	29,022.85	31,590.78
General bureau	62,093.81	55,253.46
Bureau of pay rolls	89,738.34	97,009.44
Clubs and playgrounds	122,956.62	217,921.42
Cable record	10,154.46	12,199.31
Office motor cars	16,596.80	21,945.22
Cablegrams and radiograms	9,721.03	9,561.10
Miscellaneous	1,352.52	4,542.79
Bureau of statistics	13,193.21	15,129.53
Bureau of shipping commissioner		33,264.95
Total executive office	527,098.30	609,016.88
Charged to other interests	111,045.92	155,225.71
Amount apportioned	416,052.38	513,791.17

¹ Credit.

TABLE NO. 6.—Statement of overhead expenses, fiscal year 1920—Continued.

	Fiscal year 1919.	Fiscal year 1920.
Engineer of maintenance:		
Office engineer.....	\$48,346.07	\$54,180.11
Surveys.....	38,828.34	43,993.31
Meteorology and hydrography.....	33,920.22	35,793.67
Total.....	121,094.63	134,967.09
Charged to other interests.....	45,932.35	41,861.05
Amount apportioned.....	75,162.28	93,106.04
Electrical division:		
Lights, street, lodge halls, and churches.....	6,797.29	14,609.73
Amount apportioned.....	6,797.29	14,609.73
Municipal engineering:		
Operation and maintenance of waterworks.....	418,556.79	449,595.60
Repairs to sewer system.....	22,027.25	24,966.88
Repairs to roads.....	439,374.24	135,299.56
Total.....	879,958.28	610,862.04
Charged to other interests.....	468,842.99	294,434.49
Amount apportioned.....	411,115.29	316,427.55
Grand total:		
Administration.....	4,221,708.78	4,235,868.95
Charged to other interests.....	1,021,909.39	968,438.03
Amount apportioned.....	3,199,859.39	3,267,430.92
Total overhead expenses.....	6,279,321.20	6,541,050.66
Charged to other interests.....	1,725,531.04	1,802,611.41
Total amount apportioned.....	4,553,790.16	4,738,439.25
Distribution:		
Operation and maintenance of Canal.....	3,382,167.30	3,324,167.10
Construction of Canal.....	149,510.97	54,755.89
Fortifications.....	119,385.48	328,721.46
Business operations.....	724,472.09	887,319.51
Expenses of sales—construction, material, and equipment.....	61,529.17	17,498.39
Public works in cities of Panama and Colon.....	5,795.25	9,756.49
Repairs to steamships Aneon and Cristobal.....	121.86	16,122.72
Censorship of mails.....	9,316.70	13,226.31
Regulation of commerce.....	3,015.15	1,430.32
Capital additions.....	98,476.19	103,754.32
Total.....	4,553,790.16	4,738,439.25

¹ Credit.

TABLE NO. 7.—Statement of profit and loss on business operations for fiscal year ended June 30, 1920.

	Cost.	Revenue.	Profit or loss.
DEPARTMENT OF OPERATION AND MAINTINANCE.			
Construction and repairs.....	\$1,725,601.51	\$1,726,399.69	\$798.18
Shopwork.....	4,844,622.95	5,026,914.49	182,291.54
Electric work.....	456,650.70	465,853.33	9,202.63
Electric currents.....	174,692.06	181,348.64	6,656.58
Train service and use of rolling equipment.....	188.30	236.81	38.51
Tug service.....	401,144.61	324,370.12	1 76,774.49
Service of other floating equipment.....	74,690.94	81,243.71	6,552.77
Pilotage.....	62,610.74	78,105.00	15,494.26
Wharfage.....	24,953.36	32,206.97	7,253.61
Sales of water.....	211,939.25	239,719.31	27,780.05
Panama waterworks.....	110,600.10	110,600.10	.....
Panama pavements.....	15,823.07	15,823.07	.....
Colon waterworks.....	69,271.49	69,271.49	.....
Colon pavements.....	7,094.66	7,094.66	.....
Handling lines on docks.....	84,673.99	65,518.00	1 19,155.99
Handling lines on locks.....	4,064.68	1,434.00	1 2,630.68
Steamship inspection.....	1,346.34	2,985.75	1,639.41
Dredging.....	85,779.98	85,779.98	.....
Minor services, supplies and property.....	22,031.10	23,386.77	1,355.67
Dry dockage:			
Balboa.....	121,905.42	148,206.53	26,301.11
Cristobal.....	26,187.18	35,502.04	9,314.86
Total department of operation and maintenance.....	8,525,882.44	8,722,000.46	196,118.02
SUPPLY DEPARTMENT.			
Subsistence:			
Hotel Tivoli.....	203,433.16	205,533.00	2,099.84
Hotel Aspinwall.....	56,204.97	45,240.51	1 10,964.46
Line hotels.....	739,177.27	665,764.15	1 73,413.12
Messos.....	160,131.65	158,822.85	1 1,308.80
Minor services, supplies, and property.....	.....	1,941.13	1,941.13
Total subsistence.....	1,158,947.05	1,077,301.64	1 81,645.41
QUARTERMASTER.			
Material from stock.....	1,638,597.07	1,689,321.79	50,724.72
Fuel oil.....	1,006,393.61	1,228,133.66	221,740.05
Rock, sand, gravel, and screenings.....	29,583.65	29,583.65	.....
Printing and binding.....	55,336.26	54,940.85	1 395.41
Corral.....	146,449.96	147,307.50	857.54
Rental of gold quarters.....	829.97	829.97	.....
Rental of silver quarters.....	148,936.89	117,346.19	1 31,590.70
Garage rental.....	2,916.52	8,601.04	5,684.52
Ancon nursery.....	5,545.94	5,545.94	.....
Handling fuel oil.....	77,456.35	146,449.32	68,992.97
Operation of stores.....	54,047.97	54,047.97	.....
Operation of quarters.....	140,600.00	140,600.00	.....
Minor services, supplies, and property.....	177,929.90	178,161.93	232.03
Las Cascadas, silver settlement.....	4,035.11	4,035.11	.....
Total quartermaster.....	3,488,689.20	3,804,904.92	316,215.72
ACCOUNTING DEPARTMENT.			
Lost metal checks.....	17.35	379.12	361.77
Cablegrams.....	1,511.56	1,979.34	467.78
Service to Panama Railroad Company.....	228,100.05	228,161.77	1.72
Safety deposit boxes.....	529.60	529.60	.....
Minor services, supplies, and property.....	103.76	103.76	.....
Total, accounting department.....	230,322.32	231,153.59	831.27
HEALTH DEPARTMENT.			
Ancon Hospital:			
Fees.....	462,657.59	249,763.47	1 212,894.12
Mess.....	17,230.93	17,230.93	.....
Burials.....	7,851.40	7,851.40	.....
Miscellaneous.....	2,491.48	2,491.48	.....
Colon Hospital:			
Fees.....	38,156.14	31,167.57	1 6,988.57
Mess.....	4,720.02	4,720.02	.....
Miscellaneous.....	383.17	383.17	.....
Palo Seco Asylum.....	18,454.76	14,104.53	1 4,350.23
Line dispensaries.....	17,012.43	17,012.43	.....

1 Credit.

TABLE NO. 7.—*Statement of profit and loss on business operations for fiscal year ended June 30, 1920—Continued.*

	Cost.	Revenue.	Profit or loss
HEALTH DEPARTMENT—continued.			
Quarantine:			
Subsistence.....	\$32,804.84	\$33,897.07	\$1,092.23
Other charges.....	8,058.97	8,058.97	.....
Sanitation:			
Panama.....	10,976.59	10,976.59	.....
Colon.....	14,937.76	14,937.76	.....
Zone.....	15,754.78	15,754.78	.....
Street cleaning, garbage collection, disposal, and incineration:			
Panama.....	88,093.38	57,326.04	¹ 30,767.34
Colon.....	30,361.18	30,361.18	.....
Corozal Hospital:			
Produce.....	15,364.33	15,364.33	.....
Pasturage.....	127.10	127.10	.....
Burials.....	931.50	931.50	.....
Insane asylum.....	50,247.14	80,570.33	30,323.19
Sales from medical store.....	22,815.63	26,033.24	3,217.61
Dental service.....	478.42	.....	¹ 478.42
Total, health department.....	859,909.54	639,063.89	¹ 220,845.65
CIVIL GOVERNMENT.			
School tuition.....	5,459.00	5,459.00	.....
Sale of school books.....	917.84	913.56	¹ 4.28
Police service.....	33,360.38	33,360.38	.....
Postal service.....	6,082.56	6,082.56	.....
Minor services, supplies, and property.....	9,887.07	9,493.82	¹ 393.25
Inspection of household goods.....	920.50	920.50	.....
Total, civil government.....	56,627.35	56,229.82	¹ 397.53
EXECUTIVE DEPARTMENT.			
Service to Panama Railroad Company.....	88,364.41	88,364.41	.....
Photographs and prints.....	1,379.30	1,379.30	.....
Motor-car service.....	9,837.80	9,858.00	20.20
Minor services, supplies, and property.....	160.03	160.03	.....
Canal Record.....	106.06	212.11	106.05
Lost photograph identification checks.....	185.90	335.94	150.04
Sale of annual reports.....	24.80	24.80	.....
Total, executive department.....	100,058.30	100,334.59	276.29
MISCELLANEOUS.			
Land rental.....	13,856.64	22,583.84	8,727.20
Building rental.....	4,013.76	7,400.27	3,386.51
Land-office expense.....	9,000.00	9,000.00	.....
Joint commission transcripts.....	7.20	7.20	.....
Equipment rental.....	46.68	46.68	.....
Pier rental.....	18,162.99	34,999.98	16,836.99
Boathouse rental.....	162.22	344.94	182.72
Total, miscellaneous.....	45,249.49	74,382.91	29,133.42
Total.....	14,465,685.69	14,705,371.82	239,686.13

¹ Credit.

TABLE NO. 8.—*Construction of Canal, and capital additions, fiscal year 1920, and totals to June 30, 1920.*

[Amounts include Canal overhead.]

	Construction of Canal, total to June 30, 1920.	Capital additions, total to June 30, 1920.	Total to June 30, 1920.
Construction of Canal:			
Prism excavation—			
Gatun to sea.....	\$11,874,182.88		\$11,874,182.88
Gatun to Pedro Miguel (Tables Nos. 23 and 24).....	107,009,684.71		107,009,684.71
Pedro Miguel to sea (Tables Nos. 23 and 24).....	18,306,625.34		18,306,625.34
Total prism excavation.....	137,190,492.93		137,190,492.93
Gatun locks.....	35,726,193.26		35,726,193.26
Pedro Miguel locks.....	15,704,575.93		15,704,575.93
Miraflores locks.....	23,085,209.37		23,085,209.37
Gatun spillway.....	4,081,516.86		4,081,516.86
Miraflores spillway and east dam.....	1,320,389.95		1,320,389.95
Gatun dam.....	9,823,140.60		9,823,140.60
Gatun-Mindí levee.....	140,635.01		140,635.01
Trinidad River dam.....	66,385.47		66,385.47
Pedro Miguel dams.....	431,703.66		431,703.66
Miraflores West dam.....	1,159,789.78		1,159,789.78
La Boca locks and dams (abandoned).....	748,054.48		748,054.48
Colon East breakwater.....	3,771,111.74		3,771,111.74
Colon West breakwater.....	4,275,316.42		4,275,316.42
Noas Island breakwater.....	1,015,649.78		1,015,649.78
Aids to navigation.....	868,619.33		868,619.33
Improvements—Cristobal Harbor.....	162,619.80		162,619.80
Total, Canal.....	102,380,911.44		102,380,911.44
Auxiliary works:			
Power producing and transmitting system (Table No. 21)—			
Gatun hydroelectric plant.....	1,648,990.55	\$3,484.55	1,652,475.10
Miraflores steam-electric plant.....	307,485.78		307,485.78
Substations, transmission, and distribution lines.....	3,700,591.52	67,008.62	3,768,200.14
Street lighting, townsites.....	90,033.26	6,728.03	96,761.29
Underground duct system, townsites.....	393,289.93	15,523.22	408,813.15
Total power producing and transmitting system.....	6,140,391.04	93,344.42	6,233,735.46
Pacific terminals—			
Coaling station.....	2,284,568.35		2,284,568.35
Fuel-oil plant.....	394,126.69	12,200.83	406,387.52
Dry dock.....	3,539,554.91		3,539,554.91
Docks.....	3,184,964.31		3,184,964.31
Dredging inner harbor.....	3,060,661.57		3,060,661.57
Entrance basin.....	489,480.39		489,480.39
Preparatory work.....	1,808,921.65		1,808,921.65
Total, Pacific terminals.....	14,762,277.87	42,200.83	14,804,538.70
Atlantic terminals—			
Coaling station.....	3,679,797.59		3,679,797.59
Fuel-oil plant.....	310,113.00	47,952.09	358,065.09
Dry dock.....	73,475.51		73,475.51
Docks.....	2,208,996.80		2,208,996.80
Total, Atlantic terminals.....	6,272,382.90	47,952.09	6,320,334.99
Gatun dock.....	8,951.33		8,951.33
Permanent townsites (Table No. 22)—			
Cristobal.....	122,040.71	206,385.60	328,426.31
Gatun.....	1,704.70	71.86	1,776.56
Pedro Miguel.....	91,709.06	5,088.02	96,797.08
Red Tank.....	2,614.43		2,614.43
Galboa-Ancon.....	582,063.04	14,216.59	596,279.63
La Boca.....	123,206.13		123,206.13
Total, permanent townsites.....	923,338.07	225,762.07	1,149,100.14

TABLE NO. 8.—*Construction of Canal, and capital additions, fiscal year 1920, and totals to June 30, 1920—Continued.*

	Construction of Canal, total to June 30, 1920.	Capital additions, total to June 30, 1920.	Total to June 30, 1920.
Buildings (Table No. 20):			
Designing and preliminary expenses—			
Offices—			
Administration, Balboa.....	\$1,224,847.51	.....	\$1,224,847.51
Administration, Santa Rosa.....	130,892.39	.....	130,892.39
Balboa shops.....	238,553.94	.....	238,553.94
Balboa terminals.....	80,634.42	.....	80,634.42
Shops—			
Balboa.....	3,970,490.55	\$11,801.92	3,982,292.47
Cristobal.....	163,203.14	43,444.79	206,647.93
Storehouses.....	1,009,428.68	128,484.27	1,137,912.95
Hotels and mess halls.....	487,238.87	80,413.00	567,651.87
Gold quarters.....	4,464,143.75	292,114.92	4,756,258.67
Silver quarters.....	672,242.62	199,821.83	872,064.45
Ancon Hospital.....	1,695,220.06	.....	1,695,220.06
Colon Hospital.....	255,506.90	.....	255,506.90
Dispensaries.....	161,213.97	.....	161,213.97
Asylums.....	207,994.56	41,285.75	249,280.31
Quarantine station.....	72,469.36	7,789.12	80,258.48
Medical storehouses.....	25,471.15	.....	25,471.15
Miscellaneous buildings, health department.....	169,057.79	49,740.25	218,798.04
Post offices.....	35,982.62	.....	35,982.62
Schoolhouses.....	482,561.68	9,709.55	492,271.23
Courthouses, police and fire stations, jails, etc.....	190,884.23	1,043.27	191,927.50
Fluviographs.....	13,709.02	.....	13,709.02
Miscellaneous buildings.....	470,886.52	285,250.90	756,137.42
Total buildings.....	16,132,633.73	1,150,899.57	17,283,533.30
Playgrounds, including Balboa grand stand.....	54,474.41	.....	54,474.41
Sanitary fills.....	636,732.11	.....	636,732.11
Sanitary ditches.....	157,248.23	25,921.40	183,169.63
Landscape improvements.....	34,847.85	.....	34,847.85
Waterworks systems:			
Colon-Cristobal.....	585,642.89	.....	585,642.89
Panama-Gamboa.....	1,765,222.58	.....	1,765,222.58
Other Zone systems—			
General.....	560,876.89	11,584.68	572,461.57
Townsites.....	131,946.43	1,969.92	133,916.35
Total, waterworks systems.....	3,043,688.79	13,554.60	3,057,243.39
Roadways, streets, and walks:			
Roadways.....	520,118.33	358,076.82	878,195.15
Streets.....	527,283.83	32,295.47	579,579.30
Walks.....	90,161.03	27,073.28	117,234.31
Total, roadways, streets, and walks.....	1,137,563.19	437,445.57	1,575,008.76
Zone sewage system:			
General.....	76,457.15	28,864.50	105,321.65
Townsites.....	358,089.54	34,873.50	392,963.04
Total, Zone sewage system.....	434,546.69	63,738.00	498,284.69
Real estate:			
For joint land commission expenses.....	354,870.67	.....	354,870.67
For Canal construction and flooded areas.....	891,722.06	.....	891,722.06
For auxiliary works and buildings.....	146,258.94	.....	146,258.94
For depopulation of the Canal Zone.....	2,336,207.63	.....	2,336,207.63
Total, real estate.....	3,729,059.30	.....	3,729,059.30
Miscellaneous:			
Floating caisson.....	347,868.15	.....	347,868.15
Relocation Panama Railroad.....	9,800,626.46	.....	9,800,626.46
Investment Panama Railroad stock.....	155,818.24	.....	155,818.24
Concessions from Republic of Panama.....	10,000,000.00	.....	10,000,000.00
Purchase from New Panama Canal Co.....	38,721,690.16	.....	38,721,690.16
Total, miscellaneous.....	59,026,003.01	.....	59,026,003.01
Total, construction of Canal.....	352,065,542.89	2,100,878.55	354,166,421.44

TABLE NO. 9.—Detail of miscellaneous receipts, United States funds.

	Fiscal year 1920.	Total to date.
Receipts involving no appropriation expenditures:		
Subsidies from Panama Railroad Company.....		\$631,875.00
Dividends on Panama Railroad stock.....		344,945.00
Interest on reequipment loan.....		320,799.11
Interest on first mortgage bond loan.....		152,395.16
Interest on public works, Panama and Colon.....	\$10,961.49	402,270.49
Interest on Zone water-supply systems, proportion.....	13,793.01	123,991.09
Interest on bank balances.....	50,000.00	73,147.30
Miscellaneous rentals.....	4,592.95	243,213.03
Overages.....	10.12	520.82
Forfeitures.....	779.82	807.82
Salvaging steamship Moselle.....		210.50
Miscellaneous.....	6,341.13	6,496.54
Total.....	116,478.52	2,300,701.86
Receipts involving expenditures from appropriations:		
Not credited to assets—		
Capital cost, Panama waterworks and sewers.....	16,223.55	84,158.03
Capital cost, Panama pavements.....	11,656.42	70,475.19
Capital cost, Colon waterworks and sewers.....	13,141.07	78,323.89
Capital cost, Colon pavements.....	13,036.07	73,993.97
Tolls.....	8,493,082.56	33,303,581.67
Licenses and taxes.....	15,354.05	68,376.70
Court fees and fines.....	27,691.45	192,138.72
Post receipts.....	109,217.48	516,045.27
Miscellaneous, Canal Zone.....	836.90	5,186.57
Profit on business operations ¹	358,199.05	358,199.05
Total.....	9,058,441.60	34,660,419.06
Credits to assets:		
Sale of property.....		850,500.11
Sale of French material and equipment.....	329.19	123,992.69
Sale of Panama Canal building in city of Panama.....		80,000.00
Sale of water.....		255.43
Mess accounts.....		46,879.48
Hospital receipts.....		79,962.68
Quarantine receipts.....		24,900.53
Laundry receipts.....		7,382.01
Rental of lands and buildings.....		41,427.21
Rentals, miscellaneous.....		137,822.99
Telegraph and telephone receipts.....		3,547.35
Hotels and messes.....		758,470.34
Hotel coupon books.....		32,238.28
Corral receipts.....		8,628.56
Labor furnished Panama Railroad Company.....		180,336.97
Other labor furnished.....		27,449.55
Repayments, equipment loan.....		1,387,714.92
Repayments, first mortgage bond loan.....		300,000.00
Sale of Panama Railroad stock.....		1,300.00
Miscellaneous.....		93,805.47
Sale of construction material and equipment.....	174,440.69	1,016,202.18
Profit on business operations ¹	(118,512.92)	12,293.52
Forfeitures by contractors.....		
Total.....	56,256.96	5,215,140.30
Grand total.....	9,231,177.08	42,176,261.22
Miscellaneous receipts deposited in United States Treasury.....		41,654,083.70
Cash on hand June 30, 1920.....		147,664.86
Amount of water rentals, Panama and Colon, credited to miscellaneous receipts.....	833,152.66	
Amount of water rentals, Panama and Colon, deposited as miscellaneous receipts.....	738,973.61	94,179.05
Profit on business operations, 1920, not transferred to miscellaneous receipts.....		239,686.13
Unpaid bills.....		40,647.48
Total.....		42,176,261.22

¹ Profits on business operations prior to July 1, 1919, transferred from miscellaneous receipts credited to assets, to miscellaneous receipts not credited to assets.

TABLE NO. 10.—*Detail of equipment.*

Floating equipment:		
Steamships Ancon and Cristobal.....	\$2, 164, 357.31	
Colliers Ulyssee and Achilles.....	2, 029, 232.05	
Tugs and supply boats.....	916, 581.54	
Launches.....	183, 011.90	
Dredges.....	1, 224, 666.60	
Barges.....	1, 072, 761.76	
Floating cranes Ajax and Hercules.....	906, 212.71	
Miscellaneous floating equipment.....	182, 295.36	
Total floating equipment.....		\$8, 679, 119. 20
Other equipment:		
Automobiles and trucks.....	215, 254.18	
Cranes.....	208, 977.02	
Motor cars.....	11, 250.00	
Road rollers.....	25, 281.00	
Miscellaneous.....	83, 294.21	
Total other equipment.....		\$44, 056. 41
Machinery and tools:		
Electrical division.....	1, 398.39	
Municipal engineering division.....	58, 239.17	
Mechanical division.....	377, 070.15	
Building division.....	49, 043.38	
Subsistence.....	102, 504.52	
Panama Canal press.....	2, 831.57	
Total machinery and tools.....		582, 057. 18
Total.....		9, 805, 232. 82

TABLE NO. 11.—*Detail of work in progress.*

Uncompleted work, mechanical division.....	\$758, 744. 50
Uncompleted work, other divisions.....	179, 217. 80
Total.....	937, 962. 46

TABLE NO. 12.—*Detail of material and supplies.*

Balboa store.....	\$3, 841, 805. 25
Cristobal store.....	830, 888. 41
Paraiso store.....	653, 582. 66
Medical store.....	131, 021. 15
Stationery store, administration building.....	22, 472. 85
Printing-plant store.....	109, 605. 55
Fuel oil.....	25, 959. 10
District quartermaster's stores:	
Cristobal.....	\$6, 100. 00
Gatun.....	28, 510. 02
Paraiso-Pedro Miguel.....	1, 115. 12
Balboa-Ancon.....	3, 465. 93
	39, 191. 07
Total quartermaster's stores.....	\$5, 654, 526. 04
Containers in transit.....	123, 565. 21
Obsolete store.....	27, 365. 11
Material drawn by divisions not yet charged to work.....	546, 618. 22
Total.....	6, 204, 944. 16
Less price adjustments, unpaid invoices, etc.....	333, 239. 68
Net book value, material and supplies.....	5, 871, 704. 48

TABLE NO. 13.—*Detail of assets received from the Canal Zone Government.*

Waterworks.....	\$10, 500. 00
Sewers.....	8, 000. 00
Roads.....	451, 887. 50
School buildings.....	72, 115. 00
Books and stationery.....	2, 289. 87
Total.....	544, 792. 37

¹ Credit.

TABLE NO. 14.—*Detail of assets transferred to other departments of the United States Government.*

To Army on Canal Zone:	
Waterworks system—	
Las Cascadas.....	\$14,250.00
Empire.....	278,300.00
Culebra.....	12,000.00
Corozal.....	6,500.00
Total waterworks.....	\$311,050.00
Sewer systems—	
Las Cascadas.....	11,500.00
Empire.....	23,500.00
Culebra.....	9,500.00
Corozal.....	6,000.00
Total sewer system.....	50,500.00
Roads—	
Las Cascadas.....	50,700.00
Empire.....	140,500.00
Culebra.....	40,000.00
Corozal.....	18,000.00
Total roads.....	249,200.00
Buildings—	
Las Cascadas.....	126,416.00
Empire.....	369,749.17
Culebra.....	244,586.41
Corozal.....	206,552.25
Gatun.....	50,782.65
Cristobal.....	13,248.00
Margarita Island.....	375.50
Toro Point.....	24,076.24
	1,035,788.22
Chagres River tract.....	69,861.99
Railroad tracks, Fort Amador.....	8,773.00
Total transferred to Army.....	1,725,171.21
To State Department, legation building, Panama City.....	22,256.00
To Alaskan Engineering Commission—Equipment.....	337,912.21
To Army and Navy on Canal Zone, boathouse, Colon.....	2,003.25
Total.....	2,087,342.67

TABLE NO. 15.—*Detail of Panama Canal equipment and property operated by the Panama Railroad.*

Locomotives.....	\$309,468.85
Steel flat cars.....	257,934.62
Oliver dump cars.....	225,332.90
Lidgerwood flat cars.....	85,307.22
Floating equipment (barges and launches).....	132,813.26
Other miscellaneous equipment.....	50,711.73
Wooden dock, Cristobal.....	40,000.00
Steamships:	
Panama.....	\$400,000.00
Colon.....	400,000.00
Caribbean.....	157,394.60
Culebra.....	109,325.00
	1,066,629.60
Total.....	2,168,198.18

TABLE NO. 16.—*Detail of Panama Railroad equipment and property operated by The Panama Canal.*

Floating equipment.....	\$35,035.00
Other equipment.....	19,136.72
Buildings and structures.....	414,554.78
Concrete dock, Balboa.....	373,742.10
Total.....	842,468.60

TABLE NO. 17.—*Detail of reserves for gratuity, depreciation, and repairs.*

Gratuity:		
Building division.....	\$116,979.82	
Electrical division.....	80,749.47	
Mechanical division.....	239,300.08	
Municipal engineering division.....	47,360.92	
Fortifications.....	34,280.66	
Miscellaneous.....	288,940.06	
		\$813,591.01
Depreciation:		
Equipment—		
Tugs and supply boats.....	306,833.92	
Launches.....	53,095.99	
Dredges.....	291,691.24	
Barres.....	398,121.97	
Floating cranes.....	121,662.69	
Miscellaneous.....	50,627.93	
Crane boat La Valley.....	\$11,932.28	
Graders 1, 2, and 3.....	28,406.09	
Pile driver No. 2.....	1,430.79	
Coal hoist No. 1.....	1,264.60	
Drill barre Teredo No. 2.....	531.25	
Air compressor.....	7,062.92	
Total floating equipment.....		1,222,033.74
Automobiles and trucks.....	94,297.38	
Cranes.....	71,389.45	
Railroad motor cars.....	2,590.12	
Road rollers.....	13,648.14	
Miscellaneous.....	8,789.75	
Total other equipment.....		190,714.84
Buildings—		
Balboa store.....	67,390.02	
Cristobal store.....	2,414.30	
Cristobal oil house.....	1,650.00	
Total buildings.....		71,454.32
Structures and plants—		
Mount Hope fuel-oil plant.....	60,432.76	
Balboa fuel-oil plant.....	81,335.00	
Balboa dry dock.....	120,000.00	
Pier No. 18, Balboa.....	47,030.50	
Transmission system.....	649,028.70	
Total structures and plants.....		957,826.96
Repairs:		
Equipment—		
Tugs and supply boats.....	97,098.02	
Launches.....	11,888.59	
Dredges.....	154,965.66	
Barres.....	135,870.85	
Floating cranes.....	166,383.64	
Miscellaneous.....	18,175.05	
Total floating equipment.....		334,323.21
Railroad motor cars.....	1,846.16	
Road rollers.....	87.24	
Miscellaneous (Balboa shops).....	7,932.54	
Total other equipment.....		9,865.94
Buildings—		
Balboa shops.....	115,802.57	
Balboa store.....	22,270.73	
Cristobal store.....	23,781.80	
Cristobal oil house.....	1,597.66	
Total buildings.....		31,827.62
Structures and plants—		
Balboa dry dock.....	15,946.10	
Balboa fuel-oil plant.....	66,587.20	
Mount Hope fuel-oil plant.....	57,507.51	
Balboa and Mount Hope baseball parks.....	812.35	
Transmission system.....	110,708.99	
Total structures and plants.....		108,251.97
Grand total.....		3,739,889.61
Recapitulation:		
Gratuity.....	813,591.01	
Depreciation—		
Equipment.....	\$1,412,748.58	
Structures.....	1,029,281.28	
		2,442,029.86
Repairs—		
Equipment.....	344,189.15	
Structures.....	140,079.59	
		484,268.74

TABLE NO. 18.—Statement of equipment, material, and supplies paid from construction funds (bond issue) but not directly charged to Canal construction accounts.

Material and supplies on hand July 1, 1915.....	\$4,374,860.10
Less deducted for operation and maintenance.....	2,225,000.00
	<u>2,149,860.10</u>

List of equipment purchased from construction funds with the value at which transferred for use in the maintenance and operation of The Panama Canal:

S. S. Ancon.....	\$728,271.88
S. S. Cristobal.....	716,085.43
Total, steamships.....	<u>\$1,444,357.31</u>
Tugs and supply boats:	
Berdena.....	3,400.00
Bohio.....	20,064.00
Cocoli.....	20,416.00
Coco Solo.....	9,148.70
Empire.....	28,463.50
Engineer.....	46,013.64
Gatun.....	11,692.80
Gorgona.....	156,921.65
La Boca.....	19,747.20
Mariner.....	21,511.80
Miraflores.....	36,496.75
Porto Bello.....	29,000.00
Sanidad.....	4,675.00
Tabernilla.....	156,922.79
Total, tugs.....	<u>564,473.83</u>
Launches:	
Aspin wall.....	4,537.24
Atlantic.....	4,475.13
Barbacoas II.....	4,562.97
Bonita.....	750.00
Cruces.....	4,419.25
Flamengo.....	1,850.60
Lirio.....	1,545.00
Luiz.....	217.97
Margaret.....	1,400.00
Pacific.....	4,475.00
Patrol.....	5,484.00
Patrique.....	1,300.00
Priscilla.....	4,414.75
Psyche.....	3,000.00
Santa Rita.....	4,620.00
Search.....	6,030.00
Snail.....	625.00
No. 7.....	500.00
No. 8.....	500.00
No. 9.....	1,000.00
No. 10.....	1,000.00
No. 11.....	1,200.00
No. 12.....	1,400.00
No. 26.....	2,890.00
Total, launches.....	<u>62,796.91</u>
Clapet No. 7.....	5,950.00
Dredges:	
Cascadas.....	446,584.10
Gamboa.....	273,046.56
Marmot.....	18,759.84
Paraiso.....	273,016.60
No. 83.....	34,689.60
No. 84.....	30,536.00
No. 86.....	70,125.00
Total, dredges.....	<u>1,146,757.70</u>
Barges:	
U. S. No. 3.....	7,650.00
17.....	9,856.00
18.....	11,000.00
20.....	11,000.00
36.....	1,000.00
38.....	300.00
39.....	300.00
46.....	8,064.00
48.....	9,680.00
49.....	9,680.00
50.....	9,680.00
57.....	2,488.20
91.....	678.60
92.....	127.50
93.....	150.00
95.....	403.01
96.....	2,400.00
97.....	2,245.76

TABLE No. 18.—Statement of equipment, material, and supplies paid from construction funds (bond issue) but not directly charged to Canal construction accounts—Continued.

Barges—Continued.

U. S. No. 98.....	\$2,042.00	
101.....	7,804.04	
102.....	7,804.04	
103.....	7,804.04	
104.....	7,804.04	
105.....	7,804.04	
106.....	7,804.04	
107.....	10,000.00	
108.....	7,804.04	
109.....	7,804.04	
116.....	7,313.80	
117.....	7,313.80	
118.....	7,313.80	
119.....	7,313.80	
121.....	7,776.00	
122.....	7,776.00	
123.....	8,553.60	
131.....	67,254.19	
132.....	67,254.19	
133.....	67,254.19	
134.....	67,254.19	
135.....	67,254.19	
136.....	67,254.19	
137.....	71,828.69	
138.....	71,828.69	
139.....	71,828.70	
140.....	78,897.31	
141.....	89,394.84	
142.....	36,432.64	
143.....	36,432.64	
144.....	36,432.64	
145.....	36,432.64	
146.....	4,785.89	
147.....	4,785.89	
148.....	4,785.89	
170.....	2,000.00	
171.....	4,000.00	
176.....	1,000.00	
179.....	2,160.00	
187.....	300.00	
202.....	255.00	
217.....	935.00	
220.....	300.00	
222.....	255.00	
Total, barges.....		\$1,173,134.78
Floating cranes:		
Ajax.....	448,335.79	
Hercules.....	457,876.92	
Total, floating cranes.....		906,212.71
Miscellaneous floating equipment:		
Drill barge <i>Teredo</i> , No. 2.....	15,000.00	
Compressor barge No. 27.....	20,848.00	
Derrick barge No. 161.....	19,838.10	
Coal hoist No. 168.....	2,112.00	
Unwatering barge No. 169.....	30,076.85	
Grader No. 1.....	43,538.77	
Grader No. 3.....	28,690.30	
Crane boat <i>La Valle</i>	19,503.00	
Floating pile driver <i>Bruiser</i>	2,550.00	
Total, miscellaneous floating equipment.....		182,157.02
Cranes:		
No. 1.....	400.00	
U. S. 23.....	2,000.00	
24.....	2,000.00	
25.....	2,000.00	
27.....	4,000.00	
28.....	4,000.00	
32.....	8,000.00	
34.....	5,000.00	
35.....	5,000.00	
36.....	5,000.00	
37.....	3,500.00	
42.....	3,300.00	
43.....	3,300.00	
50.....	3,000.00	
51.....	6,658.00	
53.....	3,300.00	
55.....	4,500.00	
56.....	4,500.00	
61.....	6,500.00	
62.....	7,260.30	

TABLE NO. 18.—Statement of equipment, material, and supplies paid from construction funds (bond issue) but not directly charged to Canal construction accounts—Continued.

Cranes—Continued.		
U.S. 63.....	\$4,550.00	
64.....	8,000.00	
66.....	3,550.00	
67.....	3,500.00	
68.....	5,500.00	
69.....	5,700.00	
70.....	6,800.00	
71.....	6,800.00	
72.....	6,400.00	
73.....	6,400.00	
75.....	6,900.00	
76.....	6,900.00	
77.....	6,900.00	
78.....	6,900.00	
79.....	6,900.00	
80.....	6,900.00	
81.....	6,900.00	
82.....	6,900.00	
83.....	4,000.00	
84.....	4,822.00	
Total, cranes.....		\$204,440.30
Motor cars:		
No. 1.....	5,000.00	
6.....	1,500.00	
7.....	2,000.00	
Total, motor cars.....		8,500.00
Road rollers:		
No. 2.....	2,236.00	
3.....	2,750.00	
4.....	2,500.00	
6.....	3,000.00	
7.....	2,875.00	
8.....	2,595.00	
9.....	3,005.00	
10.....	2,750.00	
11.....	3,005.00	
12.....	3,025.00	
Total, road rollers.....		27,781.00
Miscellaneous equipment:		
Pay car No. 1.....	1,289.75	
Locomotive 401.....	400.00	
403.....	400.00	
467.....	400.00	
Pile driver 102.....	4,800.00	
Total, miscellaneous equipment.....		7,289.75
Total.....		\$5,733,851.31
Tug <i>Reliance</i> (lost at sea Aug. 2, 1918).....		59,922.08
Total.....		7,943,633.49
Statement of construction equipment transferred to the Panama Railroad:		
Floating equipment—		
Steamship <i>Panama</i>	400,000.00	
Steamship <i>Colon</i>	400,000.00	
		800,000.00
Dredge <i>Caribbean</i>	157,304.60	
Dredge <i>Culebra</i>	109,325.00	
		266,629.60
Launches—		
<i>Ancon</i>	678.31	
<i>Taboguilla</i>	2,584.72	
<i>Vidette</i>	2,900.13	
No. 1355.....	2,476.05	
		8,359.21
Barges—		
No. 1.....	10,000.00	
2.....	9,047.25	
4.....	11,177.90	
13.....	11,065.00	
19.....	11,171.31	
26.....	16,808.51	
28.....	5,587.00	
29.....	11,094.50	
37.....	200.00	
47.....	9,680.00	
149.....	5,600.00	
150.....	5,600.00	
167.....	17,012.58	
		124,454.05

TABLE NO. 18.—*Statement of equipment, material, and supplies paid from construction funds (bond issue) but not directly charged to Canal construction accounts—Continued.*

Statement of construction equipment transferred to the Panama Railroad—Continued.

Rolling stock—

43 locomotives.....	\$309,468.85	
491 steel flat cars.....	257,934.62	
450 Oliver dump cars.....	225,332.90	
194 Lidgerwood flat cars.....	85,307.22	

\$878,043.59

Other equipment—

2 cranes (Nos. 26 and 40).....	8,785.01	
2 plows (Nos. 27 and 28).....	400.00	
2 track shifters (Nos. 5 and 7).....	1,872.00	
3 spreaders (Nos. 36, 37, 39).....	6,600.00	
5 steam shovels (Nos. 56, 121, 203, 204, 213).....	17,316.90	
3 unloaders (Nos. 26, 32, 36).....	6,000.00	
Miscellaneous equipment.....	9,737.82	

50,711.73

Total, transferred to Panama Railroad.....

2,128,198.18

Statement of construction equipment transferred to the Alaskan Engineering Commission:

24 locomotives.....	95,138.88	
7 narrow-gauge locomotives.....	6,975.00	
35 Oliver dump cars.....	4,550.00	
70 Western dump cars.....	8,400.00	
408 Lidgerwood flat cars.....	150,960.00	
2 pile drivers (Nos. 2 and 5).....	1,646.95	
1 spreader (No. 43).....	2,200.00	
3 steam shovels (Nos. 54, 111, 130).....	5,900.00	
2 unloaders (Nos. 29 and 38).....	2,400.00	
Miscellaneous.....	59,791.38	

Total, transferred to Alaska.....

337,912.21

TABLE NO. 19.—*Detailed cost, Pier No. 6, Cristobal, to June 30, 1920.*

	Quantity.	Amount.	Unit cost.
Surveys.....		\$17,196.20	
Designing.....		32,841.98	
Testing.....		1,448.37	
Preliminary borings.....linear feet	2,924.6	1,514.78	\$0.5179
Final borings.....do	6,603	2,496.69	.3781
Preparing site.....		10,424.48	
Cleaning around site.....		501.75	
Preliminary work.....		49,425.58	
Dredging.....		4,627.99	
Maintenance range lights.....		198.26	
Caisson, 6 feet diameter.....linear feet	22,610	335,291.67	14.8294
Excavation inside caissons.....cubic yards	14,117.01	86,634.51	6.1369
Concrete in caissons.....do	22,005.8	122,013.84	5.5446
Pedestals.....each	190	1,338.93	7.0470
Bumping posts.....		309.50	
Column anchor bolts.....		2,946.14	
Mooring bitts.....		4,270.77	
Silver toilets.....		540.71	
Winch motor anchors.....		1,018.42	
Fender system.....		37,961.05	
Arches and large girders, concrete floor system:			
Placing forms.....square feet	206,058	96,289.93	.46730
Placing reinforcing.....pounds	3,417,640	147,567.56	.04318
Placing concrete.....cubic yards	1,429,880	95,957.30	.06710
Struts.....pounds	1,565,795	123,957.52	.07917
Floor beams:			
Placing forms.....square feet	232,820	50,306.06	.21610
Placing reinforcing.....pounds	1,910,440	93,834.73	.04912
Placing concrete.....cubic yards	6,609.4	63,992.16	9.6820
Slab—Concrete floor system:			
Placing forms.....square feet	134,413	25,330.19	.18850
Placing reinforcing.....pounds	600,640	39,735.97	.06616
Placing concrete.....cubic yards	6,953.8	67,935.71	9.76960
Apron tracks.....		16,416.17	
Temporary water lines.....		557.09	
Temporary power lines.....		481.77	
Drains.....		1,297.81	
Electrical work in floor.....		29,176.18	
Handling miscellaneous material account, floor system.....		10.00	
Reinforced concrete shed (columns except in end wall):			
Placing forms.....square feet	42,580	8,690.57	.2041
Placing reinforcing.....pounds	107,600	7,344.34	.0683
Placing concrete.....cubic yards	764	10,132.79	13.2628

TABLE NO. 19.—Detailed cost, Pier No. 6, Cristobal, to June 30, 1920—Continued.

	Quantity.	Amount.	Unit cost.
Trusses:			
Placing forms.....square feet..	103,640	\$13,917.96	\$0.1343
Placing reinforcing.....pounds..	971,795	45,831.02	.04716
Placing concrete.....cubic yards..	1,852	20,607.89	11.1274
Erection of trusses.....		7,500.13	
Concrete—Side walls (girders and pilasters):			
Placing forms.....square feet..	80,078	27,501.38	.3434
Placing reinforcing.....pounds..	240,175	13,617.64	.0567
Placing concrete.....cubic yards..	1,502	25,263.24	16.8197
Concrete—end walls:			
Placing forms.....square feet..	23,276	7,987.77	.3432
Placing reinforcing.....pounds..	43,420	3,596.90	.0828
Placing concrete.....cubic yards..	298	4,156.47	13.9479
Scaffolding.....		646.57	
Roofs:			
Placing forms.....square feet..	123,372	18,561.24	.1504
Placing reinforcing.....pounds..	164,000	9,888.21	.0603
Placing concrete.....cubic yards..	1,623	25,271.10	15.5706
Barrett specification roofing.....		21,576.08	
Brick payment:			
Brick.....		1,320.44	
Steel doors:			
End doors.....		2,486.90	
Side doors.....		49,421.04	
Miscellaneous:			
Windows and louvers.....		6,968.33	
Skylights.....		1,093.03	
Telephone and transformer booths.....		1,569.31	
Gold toilets.....		2,357.76	
Wheel guards.....		11,345.07	
Overhead cranes.....		3,810.77	
Crane tracks.....		7,137.51	
Trolleys for cranes.....		398.74	
Electrical work for lighting system.....		811.34	
Plant credits.....		(1,134.30)	
Total, division cost, Pier No. 6.....		1,925,545.01	

TABLE NO. 20.—Detail of buildings, fiscal year 1920, and to June 30, 1920.

[Amounts include Canal overhead.]

	Fiscal year 1920.	Total to June 30, 1920.
Anemometer tower, Balboa Heights.....		\$1,987.45
Asylums:		
Corozal asylum buildings.....	\$257.59	105,160.40
Tuberculosis ward, Corozal.....	13,481.48	35,915.82
Chicken house, Corozal.....		1,884.55
Compost pit, Corozal.....		784.05
Dairy buildings, Corozal.....		14,104.06
Dairy shed, Corozal.....		26,387.23
Guinea pig house, Corozal.....		342.97
Gold quarters, Corozal.....	1,227.28	2,443.12
Horshoe house, Corozal.....		14,865.68
Nurses' quarters, Corozal.....	2,901.65	2,901.65
Palo Seco buildings.....		46,833.90
Total, asylums.....	15,413.44	251,723.43
Band stands:		
Cristobal.....		471.25
Gatun.....		375.00
Paraiso.....		640.25
Total, band stands.....	35.91	1,486.50
Boathouse, Gatun.....		9,361.20
Boy Scouts, Paraiso.....		.210.00
Cemetery, Corozal.....		2,010.14
Churches:		
Ancon—Episcopal.....	975.00	975.00
Ancon—Catholic.....	1,100.00	1,100.00
Cristobal—Union.....		1,275.00
Total, churches.....	2,075.00	3,350.00

¹ Credit.

TABLE NO. 20.—Detail of buildings, fiscal year 1920, and to June 30, 1920—Continued.

	Fiscal year 1920.	Total to June 30, 1920.
Clubhouses:		
Balboa, main building		\$22,042.72
Balboa, motion-picture hall	\$14,452.52	16,120.56
Cristobal		19,250.00
Gatun		15,750.00
Gatun, silver employees'	3,714.00	11,345.34
La Boca, silver employees'		8,256.38
Paraiso		18,522.99
Pedro Miguel		25,025.29
Red Tank, silver employees'		11,538.21
Ancon (includes lodge hall)		4,800.00
Total, clubhouses	18,166.52	152,651.50
Corral buildings:		
Ancon		18,000.00
Gatun		3,115.50
Paraiso		200.00
Pedro Miguel		2,433.64
Cristobal	2,491.46	21,256.23
Total, corral buildings	2,491.46	45,005.37
Courthouses, fire and police stations:		
Courthouse, Cristobal		18,900.00
Fire stations—		
Ancon		4,398.75
Balboa, concrete		20,655.88
Mount Hope, Cristobal		680.00
Cristobal	12,650.13	12,650.13
Gatun		2,030.00
La Boca		318.66
Paraiso		520.00
Pedro Miguel		2,033.27
Total, fire stations	12,650.13	43,286.69
Police stations—		
Ancon		4,620.00
Balboa		12,725.81
Cristobal		6,820.00
Gamboa		760.00
Gatun		4,200.00
New Gatun		520.00
Paraiso		195.00
Pedro Miguel		9,900.00
Total, police stations		39,740.81
Total, courthouses, fire and police stations	12,650.13	101,927.50
Dispensaries:		
Ancon, concrete		62,856.48
Balboa, concrete		19,038.11
Gatun, concrete		38,650.61
Pedro Miguel, concrete		40,668.77
Garage, Pedro Miguel dispensary	545.72	545.72
Total, dispensaries	545.72	161,759.69
Fuel shed, district quartermaster, Balboa Heights		3,778.76
Garages:		
Motor truck, Ancon corral		21,442.34
Ancon-Balboa-Balboa Heights district	15,611.91	57,221.76
Railroad motor cars, Balboa Heights		13,011.58
Cristobal-Colon district	4,553.37	13,541.68
Gatun	2,573.20	9,489.56
Pedro Miguel district	414.57	10,069.25
Total, garages	23,153.05	124,776.17
Hospital, Ancon:		
Administration building, concrete		192,611.24
Bakeshop and storeroom, concrete	11,591.32	11,591.32
Boiler house, concrete		17,639.57
Crematory, concrete		14,857.49
Garage, concrete		6,817.57
Isolation ward, concrete		134,781.13
Kitchen and mess, concrete		141,841.52
Laboratory, concrete		107,331.69

TABLE NO. 20.—Detail of buildings, fiscal year 1920, and to June 30, 1920—Continued.

	Fiscal year 1920.	Total to June 30, 1920.
Hospital, Ancon—Continued.		
Main stairway, concrete.....		\$15,287.03
Nurses' quarters, concrete.....		143,862.38
Passageway, concrete.....		35,003.29
Superintendent's quarters, concrete.....	\$1,890.42	33,339.81
Wards, sections A, B, C, and D, concrete.....	3,839.99	840,265.62
Total, hospital, Ancon.....	17,321.73	1,695,220.06
Hospital, Colon:		
Garage.....	6,861.36	6,861.36
Morgue, concrete.....		5,107.20
Nurses' quarters, concrete.....		38,277.94
Wards, concrete.....		205,260.40
Total, hospital, Colon.....	6,861.36	255,506.90
Hotels and mess halls:		
Tivoli kitchen, concrete, Ancon.....		56,146.01
Tivoli hotel, frame, Ancon.....		180,300.00
Linen room, Tivoli hotel, frame, Ancon.....		1,329.99
Restaurant, concrete, Ancon.....		79,887.38
Restaurant, concrete, Ba'boa.....		80,771.75
Hotel, frame, Ba'boa.....		8,100.00
Restaurant, concrete, Cristobal.....		86,517.21
Mess hall and kitchen, frame, Camp Biedr, Cristobal.....		7,084.04
Laborers' kitchen, frame, Camp Biedr, Cristobal.....		1,140.00
Cook shed, Fast Indian, frame, Camp Biedr, Cristobal.....		121.50
Mess hall, frame, Gatun.....		6,463.81
Kitchens, laborers', frame, Gatun.....		1,200.00
Kitchen, laborers', frame, La Boca.....		8,514.10
Kitchen, European laborers', frame, Paraiso.....		357.50
Restaurant, concrete, Pedro Miguel.....	2,469.87	38,334.51
Aspinwall Hotel, frame, Taboga.....		6,583.50
Landing stage, Aspinwall Hotel.....		4,800.57
Total, hotels and mess halls.....	2,469.87	567,651.87
Incinerators:		
Ba'boa.....	49,788.43	180,106.23
Cristobal.....	121,080.87	121,080.87
Total, incinerators.....	170,869.30	301,187.10
Larvacide plant, Ancon.....		14,700.65
Lighthouse building, Gatun.....	10,890.14	22,619.03
Lodge halls:		
Ba'boa.....		1,800.00
Gatun.....		7,000.00
Gatun, silver employees'.....	2,025.55	4,400.22
La Boca, silver employees'.....		1,776.92
Pedro Miguel.....	5,320.00	17,636.16
Total, lodge halls.....	7,345.55	32,613.30
Marine division dock building, Gatun.....		207.51
Markets:		
Cristobal.....		1,382.50
Gatun.....		1,330.00
Paraiso.....		660.00
Total, markets.....		3,372.50
Meter-reading station, Pedro Miguel.....		62.35
Offices:		
Administration Building, Santa Rosa, Ancon.....		130,892.39
Municipal engineering division, Ancon.....		1,177.04
Shops, Ba'boa.....		238,553.94
Terminal, Ba'boa.....		80,634.42
Sanitary inspector and dentist, Ba'boa.....		28,248.56
Administration building, Ba'boa Heights.....		1,224,847.51
District quartermaster, Ba'boa Heights.....		19,166.24
Customs, Cristobal.....		300.00
Depot Commissary, Cristobal.....		5,850.00
Depot quartermaster, Cristobal.....		3,010.00
Municipal building, Cristobal.....	178.33	796.96
Municipal engineering and electrical divisions, Cristobal.....		4,517.50
Sanitary inspector, Culebra.....		1,800.00
Sanitary inspector, Gatun.....		1,500.00
Dredging division, Paraiso.....		480.00
Sanitary inspector, Paraiso.....		390.00
District quartermaster, Pedro Miguel.....		342.72
Hydrographer, Pedro Miguel.....	297.50	297.50
Total, offices.....	475.83	1,742,804.78

TABLE No. 20.—*Detail of buildings, fiscal year 1920, and to June 30, 1920—Continued.*

	Fiscal year 1920.	Total to June 30, 1920.
Post offices, frame:		
Ancon.....		\$4,560.00
Balboa.....		9,900.00
Corozal.....		1,592.62
Cristobal.....		7,930.00
Culebra.....		5,700.00
Gatun.....		4,200.00
Pedro Miguel.....		2,100.00
Total, post offices, frame.....		35,982.62
Quarantine stations:		
Ba.boa.....		63,392.70
Colon.....		16,048.58
Kitchen, Colon quarantine station.....	\$817.20	817.20
Total, quarantine stations.....	817.20	80,258.48
Quarters, gold:		
Two-family, concrete.....		200,312.35
Four-family, concrete.....	3.30	1,316,472.43
Bachelor, concrete.....		75,819.06
Frame.....	55,303.62	3,163,654.83
Total, quarters, gold.....	55,306.92	4,756,258.67
Quarters, silver, frame.....	59,886.81	872,064.45
Scales, track, Mount Hope, Cristobal.....		1,750.00
Schoolhouses:		
Ancon, white, concrete.....		84,947.14
Ancon, white, frame.....		5,713.60
Balboa, manual training, frame.....		1,194.11
Balboa, white (lower floor of lodge hall).....		4,150.39
Balboa, domestic science, frame.....		2,213.04
Balboa, white, concrete.....		179,768.90
Cristobal, white, concrete.....		109,595.77
Empire, colored, frame.....		2,327.45
Gatun, white, concrete.....		52,643.88
Paraiso, colored, frame.....		1,582.60
Pedro Miguel, white, concrete.....		51,592.95
Red Tank, colored, frame.....		2,255.00
Total, schoolhouses.....		497,984.83
Seamen's homes.....	15,305.39	17,505.39
Shops:		
District quartermaster, carpenter shop, Balboa.....	1,275.00	1,275.00
Electrical division, Balboa.....		423.50
Marine division, Balboa.....		122.61
Mechanical division, Balboa.....	11,801.92	3,982,292.47
Pattern shop and mess hall, Balboa.....		64,245.87
Mechanical division, Cristobal.....	43,444.79	206,647.93
District quartermaster, Gatun.....		3,300.00
Electrical division, Gatun.....		647.50
Electrical division, shop and store, Gatun.....		2,147.75
Marine division, Gatun.....		1,050.00
Municipal engineering division, plumbing shop, Gatun.....		1,870.00
Dredging division, Paraiso.....		4,678.81
Mechanical division, Paraiso.....		2,728.34
Barber, Pedro Miguel.....		180.00
District quartermaster, carpenter shop, Pedro Miguel.....		220.00
District quartermaster, shop and store, Pedro Miguel.....		5,472.24
Municipal engineering division, blacksmith shop, Pedro Miguel.....		210.00
Total, shops.....	56,521.71	4,277,012.02
Storehouses:		
Medical, concrete, Ancon.....		25,471.15
Electrical, concrete, Balboa.....	1,787.62	92,573.84
Explosives, Balboa.....		507.25
Forage, Balboa.....		6,929.84
General, concrete, Balboa.....	3,234.13	587,558.98
Launch supplies, Balboa.....		1,822.13
Lumber, concrete, Balboa.....	5,445.50	166,688.58
Oil, concrete, Balboa.....		47,214.56
Oil and empty drums, Balboa.....	24,868.59	24,868.59
Paint, concrete, Balboa.....		30,671.14
Reclamation shed, Balboa.....	13,176.97	14,923.44
Surveys, concrete, Balboa Heights.....		5,213.30
Dry dock, building No. 330, Cristobal.....		16,695.00
Dry dock, building No. 5090, Cristobal.....		27,000.00
Forage, Cristobal.....		4,500.00

TABLE NO. 20.—*Detail of buildings, fiscal year 1920, and to June 30, 1920—Continued.*

	Fiscal year 1920.	Total to June 30, 1920.
Storehouses—Continued.		
Fumigating supplies, Cristobal.....	\$283.14	\$2,471.85
General, concrete, Cristobal.....		49,184.26
Obsolete, Cristobal.....		6,270.00
Oil, Cristobal.....		5,800.00
Panama Railroad, mechanical division, and supply department, concrete, Cristobal.....	50,800.55	50,800.55
Printing plant, Cristobal.....		16,327.50
Printing plant, addition, Cristobal.....	2,750.00	5,857.47
Storage shed, building No. 3337, Cristobal store.....		342.00
Storage shed, building No. 3341, Cristobal store.....		342.00
Storage shed for obsolete material, Cristobal.....	1,291.40	5,859.87
Dynamite, Gamboa.....		4,332.56
Fuse, Gamboa.....		1,841.37
General, Gatun.....		9,750.00
Dredging party, Paraiso.....		5,558.70
Dredging division, Paraiso.....		1,000.00
General, Paraiso.....		6,000.00
District quartermaster, Pedro Miguel.....		170.00
Total, storehouses.....	103,637.90	1,224,545.83
Tile plant, Ancon.....		6,210.00
Toilets, Gatun locks.....		4,277.83
Total, buildings.....	582,240.94	17,269,824.28
Charged to—		
Canal construction.....	246,487.35	16,120,894.10
Maintenance and operation.....	278,776.82	1,047,018.74
Sanitation.....	56,855.13	93,128.01
Civil government.....	121.64	8,783.43
Total.....	582,240.94	17,269,824.28

TABLE NO. 21.—*Detailed cost power producing and transmitting system, fiscal year 1920, and to June 30, 1920.*

	Fiscal year 1920.	To June 30, 1920.
Gatun hydroelectric power plant:		
Building.....		\$574,912.79
Excavation.....		54,862.07
Operating machinery.....	\$3,393.97	771,539.90
Total, division cost.....	3,393.97	1,401,314.76
Miraflores steam-electric power plant:		
Building and site.....		233,629.74
Operating machinery.....		27,448.90
Total, division cost.....		261,078.64
Power system:		
Transformer substations—		
Balboa.....	1,689.70	291,087.76
Cristobal.....	1,457.62	332,160.98
Gamboa.....		23,775.03
Gatun.....	4,055.23	460,953.25
Gold Hill.....		1,696.77
Miraflores.....	833.04	359,946.69
Transmission line.....		1,108,692.59
Distribution and duct system.....	53,426.80	495,136.56
Underground duct system—townsites.....	14,111.99	359,180.20
Street lighting—townsites.....	6,116.41	83,701.99
Total, division cost.....	81,690.79	3,516,331.82
Total, division cost, power producing and transmitting system.....	85,084.76	5,178,725.22
Charged to—		
Canal construction.....	211,921.58	5,093,866.66
Capital additions.....	¹ 126,836.82	84,858.56
Total.....	85,084.76	5,178,725.22

¹ Credit.

TABLE NO. 22.—Detailed cost, permanent townsites, fiscal year 1920, and to June 30, 1920.

Item.	Balboa-Ancon.		Cristobal-Colon Beach.		Gatun.	
	Fiscal year 1920.	To June 30, 1920.	Fiscal year 1920.	To June 30, 1920.	Fiscal year 1920.	To June 30, 1920.
Miscellaneous improvements:						
Preliminary and general work.....		\$176, 171.18	\$926.22	\$94, 019.31		\$1, 330.09
Preliminary maintenance.....		10, 519.78				
Drainage.....		7, 903.21	18.68	18.68		
Nursery, Balboa-Ancon.....		1, 576.79				
Lot improvements.....		282, 561.33	97, 602.48	112, 585.65		3.75
General improvements—Block A.....						
Division expense.....		19, 850.98	639.97	3, 458.46		109.10
Total division cost.....		498, 583.29	99, 187.35	210, 082.10		1, 442.94
Panama Canal overhead.....		86, 737.77	9, 918.74	21, 064.70		261.76
Total cost, miscellaneous improvements.....		585, 321.06	109, 106.09	231, 146.80		1, 704.70
Municipal expenses and electrical work:						
Streets.....		391, 465.59	48, 135.22	87, 783.31		5, 469.98
Walks.....	\$2, 042.21	82, 014.97	12, 613.13	20, 098.41	\$748.99	748.99
Water system.....		55, 847.84	18, 353.09	29, 971.75		
Sewer system.....		194, 681.51	10, 815.01	113, 478.33		
Street lighting.....	1, 585.53	38, 209.60	4, 530.88	21, 707.55		5, 064.72
Underground duct system.....	5, 154.22	244, 119.74	6, 877.59	92, 772.44	1, 264.58	18, 047.95
Total division cost.....	8, 781.96	1, 006, 339.25	101, 324.92	365, 811.79	2, 013.57	29, 331.64
Panama Canal overhead.....	878.19	164, 033.68	10, 132.48	36, 581.16	201.36	3, 123.41
Total cost, municipal expenses and electrical work.....	9, 660.15	1, 170, 372.93	111, 457.40	402, 392.95	2, 214.93	32, 455.05
Total division cost, grand total.....	8, 781.96	1, 504, 922.54	200, 512.27	575, 893.89	2, 013.57	30, 774.58
Panama Canal overhead, grand total.....	878.19	250, 771.45	20, 051.22	57, 645.86	201.36	3, 385.17
Grand total, townsites.....	9, 660.15	1, 755, 693.99	220, 563.49	633, 539.75	2, 214.93	34, 159.75
Charged to Canal construction.....	56, 864.58	1, 698, 609.30	27, 043.48	375, 687.03	3, 097.56	25, 855.99
Charged to capital additions.....	¹ 47, 204.43	57, 084.69	193, 520.01	257, 852.72	¹ 882.63	8, 303.76

¹ Credit.

TABLE No. 22.—Detailed cost, permanent townsites, fiscal year 1920, and to June 30, 1920—Continued.

Item.	La Boca.		Mount Hope.		Pedro Miguel.	
	Fiscal year 1920.	To June 30, 1920.	Fiscal year 1920.	To June 30, 1920.	Fiscal year 1920.	To June 30, 1920.
Miscellaneous improvements:						
Preliminary and general work.....		\$37,557.50				\$45,884.40
Preliminary maintenance.....		31,869.40				22,488.65
Drainage.....		14,842.53				787.42
Nursery, Balboa-Ancon.....						
Lot improvements.....						
General improvements—						
Block A.....		10,221.73				
Division expense.....		2,841.06				2,162.61
Total division cost.....		97,332.22				71,323.08
Panama Canal overhead.....		25,873.91				21,362.53
Total cost, miscellaneous improvements.....		123,206.13				92,685.61
Municipal expenses and electrical work:						
Streets.....			\$6,274.29	\$6,274.29		48,958.98
Walks.....		6,267.28				348.28
Watersystem.....		21,404.50				20,188.33
Sewer system.....		27,119.75	20.14	20.14		11,921.78
Street lighting.....						17,567.10
Underground duct system.....	\$401.09	401.09			\$414.51	10,146.77
Total division cost.....	401.09	55,192.62	6,294.43	6,294.43	414.51	109,131.24
Panama Canal overhead.....	40.11	14,605.39	629.45	629.45	41.46	24,524.64
Total cost, municipal expenses and electrical work.....	441.20	69,798.01	6,923.88	6,923.88	455.97	133,655.88
Total division cost, grand total.....	401.09	152,524.84	6,294.43	6,294.43	414.51	180,454.32
Panama Canal overhead, grand total.....	40.11	40,479.30	629.45	629.45	41.46	45,887.17
Grand total, townsites.....	441.20	193,004.14	6,923.88	6,923.88	455.97	226,341.49
Charged to Canal construction.....		192,562.94			11,523.23	192,722.25
Charged to capital additions.....	441.20	441.20	6,923.88	6,923.88	11,067.26	33,619.24

¹ Credit.

TABLE NO. 22.—*Detailed cost, permanent townsites, fiscal year 1920, and to June 30, 1920—Continued.*

Item.	Red Tank.		Total.	
	Fiscal year 1920.	To June 30, 1920.	Fiscal year 1920	To June 30, 1920.
Miscellaneous improvements:				
Preliminary and general work.....			\$926.22	\$354,962.48
Preliminary maintenance.....				42,389.18
Drainage.....			18.68	45,253.07
Nursery, Balboa-Ancon.....				1,576.79
Lot improvements.....		\$2,194.43	97,602.48	398,132.60
General improvements—Block A.....				10,221.73
Division expense.....		182.32	639.97	28,604.53
Total division cost.....		2,376.75	99,187.35	881,140.38
Panama Canal overhead.....		237.68	9,918.74	155,538.35
Total cost, miscellaneous improvements.....		2,614.43	109,106.09	1,036,678.73
Municipal expenses and electrical work:				
Streets.....		12,394.93	54,409.51	552,347.08
Walks.....		3,536.67	15,404.33	113,014.60
Water system.....		2,280.52	18,353.09	129,692.94
Sewer system.....		2,216.75	10,835.15	349,438.27
Street lighting.....		3,289.43	6,116.41	85,838.40
Underground duct system.....			14,111.99	365,487.99
Total division cost.....		23,718.31	119,230.48	1,595,819.28
Panama Canal overhead.....		2,371.84	11,923.05	245,869.57
Total cost, municipal expenses and electrical work.....		26,090.15	131,153.53	1,841,688.85
Total division cost, grand total.....		26,095.06	218,417.83	2,476,959.66
Panama Canal overhead, grand total.....		2,609.52	21,841.79	401,407.92
Grand total, townsites.....		28,704.58	240,259.62	2,878,367.58
Charged to Canal construction.....	\$3,070.35	28,704.58	101,599.20	2,514,142.09
Charged to capital additions.....	¹ 3,070.35		138,660.42	364,225.49

¹ Credit.TABLE NO. 23.—*Dredging excavation—detailed cost per unit of work, fiscal year 1920.*

PACIFIC ENTRANCE—CONSTRUCTION.

Item.	Quantity.	Unit cost.
	<i>Cubic yards.</i>	
Operation, pipe-line suction dredges.....	17,800	\$0.0617
Repairs, pipe-line suction dredges.....	17,800	.0190
Depreciation, pipe-line suction dredges.....	17,800	.0033
Operation, miscellaneous floating equipment.....	17,800	.0034
Repairs, miscellaneous floating equipment.....	17,000	.0007
Depreciation, miscellaneous floating equipment.....	17,000	.0002
Pipe lines.....	17,800	.0125
Dikes.....	17,800	.0085
Surveys.....	17,800	.0046
Division expense.....	17,800	.0246
Total, division cost.....	17,800	.1385

Material excavated, all earth.

TABLE No. 23.—*Dredging excavation—detailed cost per unit of work, fiscal year 1920—Continued.*

TERMINAL FACILITIES—BALBOA.

[Balboa Inner Harbor and reclaiming land—Construction.]

Item.	Quantity.	Unit cost.
Dredging inner harbor:	<i>Cubic yards.</i>	
Operation, large dipper dredges.....	47,550	\$0.1486
Repairs, large dipper dredges.....	47,550	.1179
Depreciation, large dipper dredges.....	47,550	.0303
Operation, pipe-line suction dredges.....	15,500	.0912
Repairs, pipe-line suction dredges.....	15,500	.0276
Depreciation, pipe-line suction dredges.....	15,500	.0045
Operation, tugs, clapets, and scows.....	47,550	.0959
Repairs, tugs, clapets, and scows.....	47,550	.0937
Depreciation, tugs, clapets, and scows.....	47,550	.0143
Operation, miscellaneous floating equipment.....	63,050	.0041
Repairs, miscellaneous floating equipment.....	63,050	.0008
Depreciation, miscellaneous floating equipment.....	63,050	.0003
Pipe lines.....	15,500	.0654
Surveys.....	63,050	.0185
Division expense.....	63,050	.0512
Total, division cost.....	63,050	.4991
Earth excavated.....per cent.....	53,050	.8414
Rock excavated.....do.....	10,000	.1586
Reclaiming land:		
Pipe lines.....	8,500	.0082
Operation, relay pumps.....	8,500	.0159
Maintenance, relay pumps.....	8,500	.0014
Division expense.....	8,500	.0068
Total, division cost.....	8,500	.0323

TABLE No. 24.—*Dredging excavation—Detailed cost of unit of work, fiscal year 1920.*

GAILLARD CUT.

Item.	Quantities.	Unit cost.
	<i>Cubic yards.</i>	
Operation, large dipper dredges.....	2,050,710	\$0.0706
Repairs, large dipper dredges.....	2,050,710	.0565
Depreciation, large dipper dredges.....	2,050,710	.0089
Operation, pipe-line suction dredges.....	11,000	1.5866
Repairs, pipe-line suction dredges.....	11,000	.6234
Depreciation, pipe-line suction dredges.....	11,000	.1047
Operation, tugs and scows.....	2,050,710	.1206
Repairs, tugs and scows.....	2,050,710	.0723
Depreciation, tugs and scows.....	2,050,710	.0013
Operation, miscellaneous floating equipment.....	2,121,710	.0079
Repairs, miscellaneous floating equipment.....	2,121,710	.0019
Depreciation, miscellaneous floating equipment.....	2,121,710	.0004
Operation, drill barges.....	33,283	.9088
Repairs, drill barges.....	33,283	.1359
Depreciation, drill barges.....	33,283	.0109
Operation, hydraulic graders.....	2,121,710	.0319
Repairs, hydraulic graders.....	2,121,710	.0029
Depreciation, hydraulic graders.....	2,121,710	.0015
Drilling.....	2,121,710	.0001
Blasting.....	2,121,710	.00002
Pipe lines.....	11,000	.1062
Relay pumps.....	11,000	.0461
Channel lights.....	2,121,710	.0007
Ditching.....	2,121,710	.0007
Flumes.....	2,121,710	.00001
Sluicing.....	2,121,710	.0052
Surveys.....	2,121,710	.0162
Division expense.....	2,121,710	.0471
Maintenance of water lines.....	2,121,710	.0011
Total, division cost.....	2,121,710	.4816
Earth excavated.....per cent.....	919,835	.4336
Rock excavated.....do.....	1,201,875	.5664

TABLE NO. 24.—*Dredging excavation—Detailed cost of unit of work, fiscal year 1920—Continued.*

PACIFIC ENTRANCE—OPERATION AND MAINTENANCE.

Item.	Quantities.	Unit cost.
	<i>Cubic yards.</i>	
Operation, large dipper dredges.....	21,300	\$0.1562
Repairs, large dipper dredges.....	21,300	.1010
Depreciation, large dipper dredges.....	21,300	.0163
Operation, pipe-line suction dredge.....	1,543,600	.0747
Repairs, pipe-line suction dredge.....	1,543,600	.0237
Depreciation, pipe-line suction dredge.....	1,543,600	.0044
Operation, tugs and scows.....	21,300	.1923
Repairs, tugs and scows.....	21,300	.2227
Depreciation, tugs and scows.....	21,300	.0304
Operation, drill barges.....	13,814	1.4414
Repairs, drill barges.....	13,814	.1522
Depreciation, drill barges.....	13,814	.0123
Operation, miscellaneous floating equipment.....	1,564,900	.0039
Repairs, miscellaneous floating equipment.....	1,564,900	.0009
Depreciation, miscellaneous floating equipment.....	1,564,900	.0002
Pipe lines.....	1,543,600	.0213
Dikes.....	1,543,600	.0009
Ditching.....	1,564,900	.0009
Surveys.....	1,564,900	.0058
Division expense.....	1,564,900	.0264
Total, division cost.....	1,564,900	.1854
Earth excavated..... per cent..	1,546,900	.9885
Rock excavated..... do.....	18,000	.0115

PACIFIC INNER HARBOR—MAINTENANCE.

Dredging inner harbor:		
Operation, large dipper dredges.....	179,750	\$0.1687
Repairs, large dipper dredges.....	179,750	.1294
Depreciation, large dipper dredges.....	179,750	.0321
Operation, pipe-line suction dredges.....	325,900	.0904
Repairs, pipe-line suction dredges.....	325,900	.0277
Depreciation, pipe-line suction dredges.....	325,900	.0048
Operation, tugs and scows.....	179,750	.1356
Repairs, tugs and scows.....	179,750	.1221
Depreciation, tugs and scows.....	179,750	.0233
Operation, miscellaneous floating equipment.....	505,650	.0057
Repairs, miscellaneous floating equipment.....	505,650	.0012
Depreciation, miscellaneous floating equipment.....	505,650	.0005
Pipe lines.....	288,900	.0216
Surveys.....	505,650	.0084
Division expense.....	505,650	.0370
Total, division cost.....	505,650	.3537
Reclaiming land:		
Pipe lines.....	205,500	.0143
Operation relay pumps.....	205,500	.0196
Maintenance.....	205,500	.0036
Division expense.....	205,500	.0087
Total, division cost.....	205,500	.0462

Material excavated, all earth.

TABLE NO. 25.—*Dredging—Gamboa gravel production—Detail cost per unit of work, fiscal year 1920 (December, 1919, to June, 1920, inclusive).*

	Decem-ber.	January.	Feb-ruary.	March.	April.	May.	June.	Total.
Quantities, cubic yards.....	1,068	15,902	14,825	20,809	21,842	21,997	23,175	119,618
Unloading from barges.....	\$2.1306	\$0.0550	\$0.0708	\$0.0575	\$0.0594	\$0.0562	\$0.0518	\$0.0763
Switching.....	.0373	.1325	.1172	.1039	.1005	.0975	.0987	.1060
Storing.....		.2572	.1825	.1088	.1917	.1056	.0884	.0569
Repairs to equipment.....	.0459	.0821	.0866	.0553	.1079	.0493	2.1587	.2888
Dredging and towing.....	2.6549	.6168	.7659	.7147	.6014	.5284	.5306	.6371
Plant arbitrary.....		.2000	.2000	.2000	.2000	.2000	.2000	.1982
Division expense.....	.3121	.0506	.0432	.0350	.0373	.0269	.0359	.0397
Total, division cost.....	5.1808	1.3942	1.4662	1.2752	1.2982	1.0639	3.1641	1.4030

TABLE No. 26.—Detail of cost of production and distribution of electric current for fiscal year 1920.

	July.	August.	September.	October.	November.	December.
Power plants:						
Gatun hydroelectric.....	\$4,627.16	\$2,544.95	\$3,981.91	\$4,023.10	\$4,258.81	\$3,930.62
Miraflores steam.....	9,367.94	8,713.43	8,511.17	8,679.55	8,665.69	8,507.52
Reserve for depreciation.....	8,000.00	25,000.00	6,390.00	6,390.00	6,390.00	6,390.00
Total production cost.....	21,995.10	36,258.38	18,883.08	19,092.65	19,314.50	18,828.14
Substations:						
Cristobal.....	1,500.39	1,488.88	1,614.25	1,477.86	1,672.92	1,478.61
Gatun.....	2,168.89	955.35	1,805.26	1,555.72	1,553.12	1,813.15
Miraflores.....	1,912.84	1,458.58	1,867.82	2,032.83	2,081.87	2,012.45
Balboa.....	1,813.24	863.81	1,512.95	1,833.23	1,700.06	1,497.00
Reserve for depreciation.....			4,385.00	4,385.00	4,385.00	4,385.00
Transmission lines:						
Cristobal to Gatun.....	101.31	210.19	551.60	315.36	59.82	163.34
Miraflores to Balboa.....	265.00	25.82			30.14	
Gatun to Miraflores.....	1,494.21	1,698.19	1,349.52	699.65	398.77	363.02
Gatun underground.....						
Reserve for depreciation.....			2,250.00	2,250.00	2,250.00	2,250.00
Distribution lines.....	2,657.68	4,092.70	5,755.40	5,276.48	5,707.97	5,680.39
Reserve for repairs—power system.....				500.00	500.00	500.00
Cost of current distributed.....	33,908.66	47,051.90	39,974.88	39,418.78	39,654.17	38,971.10
Kilowatt hours distributed.....	4,417,078	4,584,693	4,345,679	4,549,394	4,365,968	4,829,153
Cost per kilowatt hour:						
Production.....	\$0.0050	\$0.0079	\$0.0043	\$0.0042	\$0.0044	\$0.0039
Current distributed.....	.0077	.0103	.0092	.0087	.0091	.0081

	January.	February.	March.	April.	May.	June.	Total.
Power plants:							
Gatun hydroelectric.....	\$4,107.22	\$4,166.26	\$4,330.86	\$4,305.62	\$4,711.14	\$3,784.06	\$48,771.71
Miraflores steam.....	6,474.27	4,993.68	25,367.22	24,965.85	20,423.12	7,431.17	142,100.61
Reserve for depreciation.....	6,390.00	6,390.00	6,390.00	6,390.00	6,390.00	6,390.00	96,900.00
Total production cost.....	16,971.49	15,549.94	36,088.08	35,661.47	31,524.26	17,605.23	287,772.32
Substations:							
Cristobal.....	1,482.48	1,664.84	1,316.32	1,340.84	1,547.01	1,656.71	18,241.11
Gatun.....	2,054.93	2,259.44	1,798.12	1,767.20	1,828.56	1,950.28	21,510.02
Miraflores.....	1,942.68	1,883.12	1,947.07	1,910.30	1,884.19	2,389.67	23,323.42
Balboa.....	1,415.09	1,426.57	1,716.97	1,841.32	1,579.72	1,871.62	19,071.58
Reserve for depreciation.....	4,385.00	4,385.00	4,385.00	4,385.00	4,385.00	4,385.00	43,850.00
Transmission lines:							
Cristobal to Gatun.....	131.60	122.10	288.97	917.71	164.12	256.13	3,282.25
Miraflores to Balboa.....	72.23	62.60	72.27	25.00	362.02	90.26	1,005.34
Gatun to Miraflores.....	642.95	499.63	740.19	2,690.42	1,089.11	807.36	12,473.02
Gatun underground.....						36.64	36.64
Reserve for depreciation.....	2,250.00	2,250.00	2,250.00	2,250.00	2,250.00	2,250.00	22,500.00
Distribution lines.....	6,364.75	5,098.63	6,335.21	5,148.47	5,102.66	5,691.25	62,911.59
Reserve for repairs—power system.....	500.00	500.00	500.00	500.00	500.00	500.00	4,500.00
Cost of current distributed.....	38,213.20	35,701.87	57,438.20	58,437.73	52,216.65	39,490.15	520,477.29
Kilowatt hours distributed.....	5,006,940	4,502,610	4,752,618	4,507,733	4,685,090	4,753,138	55,300,094
Cost per kilowatt hour:							
Production.....	\$0.0034	\$0.0035	\$0.0076	\$0.0079	\$0.0067	\$0.0037	\$0.0052
Current distributed.....	.0076	.0079	.0121	.0130	.0111	.0083	.0094

TABLE No. 27.—*Cost of water per 1,000 gallons, fiscal year 1920, Ancon-Balboa-Panama system.*

[Quantities exclude water used in city of Panama and North of Pedro Miguel.]

	Quantity, 1,000 gallons.	Mainte- nance Gamboa pump station.	Opera- tion Mira- flores filtration plant.	Opera- tion Balboa pump station.	Mainte- nance water mains.	Total.
1919.						
July.....	146,779	\$0.0162	\$0.0179	\$0.0108	\$0.0010	\$0.0459
August.....	154,651	.0151	.0186	.0107	.0077	.0521
September.....	137,207	.0174	.0221	.0160	.0383	.0938
October.....	130,829	.0160	.0225	.0135	.0307	.0827
November.....	131,725	.0047	.0151	.0057	.0359	.0614
December.....	133,253	.0287	.0276	.0256	.0355	.1204
1920.						
January.....	168,591	.0148	.0190	.0121	.0176	.0635
February.....	157,275	.0155	.0193	.0121	.0162	.0631
March.....	173,234	.0141	.0191	.0118	.0212	.0662
April.....	147,402	.0209	.0210	.0169	.0291	.0879
May.....	147,793	.0227	.0223	.0176	.0274	.0900
June.....	134,681	.0205	.0254	.0166	.0281	.0906
Total.....	1,763,420	.0172	.0208	.0140	.0225	.0745

TABLE No. 28.—*Cost of water per 1,000 gallons, fiscal year 1920, Colon-Cristobal system.*

[Quantities exclude water used in city of Colon.]

	Quantity, 1,000 gallons.	Mainte- nance Brazos brook reservoir.	Opera- tion Mount Hope filtration plant.	Opera- tion Mount Hope pump station.	Mainte- nance water mains.	Total.
1919.						
July.....	94,854	\$0.0120	\$0.0104	\$0.0173	\$0.0317	\$0.0714
August.....	129,089	.0112	.0103	.0166	.0315	.0696
September.....	133,037	.0105	.0103	.0168	.0329	.0705
October.....	137,599	.0130	.0104	.0153	.0425	.0813
November.....	142,950	.0100	.0072	.0165	1 .0079	.0258
December.....	152,807	.0061	.0129	.0333	.0248	.0771
1920.						
January.....	162,751	.0060	.0103	.0147	.0221	.0531
February.....	139,973	.0060	.0100	.0145	.0114	.0419
March.....	114,062	.0095	.0120	.0139	.0163	.0567
April.....	139,781	.0064	.0120	.0211	.0121	.0546
May.....	99,725	.0071	.0131	.0206	.0222	.0630
June.....	85,684	.0075	.0156	.0192	1 .0576	.0153
Total.....	1,532,312	.0087	.0162	.0190	.0170	.0609

1 Credit.

TABLE No. 29.—*Cost of water per 1,000 gallons, fiscal year 1920, Gatun system.*

	Quantity, 1,000 gallons.	Mainte- nance Agua Clara reservoir.	Opera- tion Agua Clara filtration plant.	Opera- tion Agua Clara pump station.	Mainte- nance water mains.	Total.
1919.						
July.....	31,297	\$0.0390	\$0.0346	\$0.0431	\$0.0207	\$0.1374
August.....	31,372	.0422	.0430	.0447	.0262	.1561
September.....	30,207	.0413	.0355	.0491	.0075	.1334
October.....	31,895	.0529	.0513	.0402	.0256	.1700
November.....	30,991	.0523	.0260	.0321	.0225	.1329
December.....	33,092	.0378	.0532	.0754	.0214	.1908
1920.						
January.....	38,152	.0318	.0386	.0419	.0100	.1223
February.....	38,299	.0250	.0382	.0382	.0135	.1149
March.....	40,532	.0221	.0598	.0357	.0096	.1272
April.....	41,629	.0193	.0748	.0443	.0127	.1511
May.....	42,292	.0360	.0660	.0528	.0080	.1504
June.....	37,956	.0234	.0666	.0279	1 .0113	.0766
Total.....	427,714	.0330	.0503	.0440	.0105	.1378

1 Credit.

TABLE NO. 30.—*Cost of operating all quarters for employees, fiscal year 1920.*

	July, 1919.	August, 1919.	September, 1919.	October, 1919.
Repairs to buildings.....	\$24,369.19	\$26,687.65	\$28,516.17	\$38,358.14
Fuel—coal and kindling.....	8,167.36	8,864.26	7,631.96	8,120.13
Grass cutting.....	3,568.60	3,741.85	3,564.39	3,825.54
Disposal of garbage.....	2,348.96	1,977.89	1,780.06	1,688.72
Repairs to furniture.....	3,349.55	3,322.69	4,483.02	4,162.27
Repairs to stoves.....	1,900.94	1,594.24	1,817.72	1,503.37
Corral service.....	4,468.55	3,904.87	5,031.05	5,199.52
Janitor service.....	7,835.78	7,569.41	8,049.70	7,771.76
Utility service.....	3,181.92	3,095.40	3,530.52	3,679.44
Care of grounds.....	6,973.47	7,067.03	6,257.43	7,392.85
Mattress factory.....	466.85	3,404.44	1,119.17	1,552.93
Electric lighting.....	7,541.36	7,671.42	7,569.39	7,750.20
Division expense.....	4,537.96	4,717.09	4,200.76	4,215.15
Total, division cost.....	78,710.49	83,618.24	83,551.28	95,220.02
Equipment and tools.....	717.82	146.25	1,937.91	414.09
Furniture, mattresses, and stoves.....	2,790.88	1,543.96	4,423.63	1,990.72
Install hot water tanks in gold bachelor quarters.....	2,218.22	220.39	268.79	12.20
Total, division cost.....	84,437.41	85,528.84	90,181.61	94,655.59

	November, 1919.	December, 1919.	January, 1920.	February, 1920.
Repairs to buildings.....	\$28,021.91	\$36,753.02	\$38,201.54	\$26,320.12
Fuel—coal and kindling.....	6,974.08	6,712.15	7,745.80	8,444.37
Grass cutting.....	3,218.47	3,510.16	4,129.92	1,615.64
Disposal of garbage.....	2,153.86	2,092.61	1,633.22	1,961.03
Repairs to furniture.....	2,822.05	3,970.75	6,349.71	4,982.75
Repairs to stoves.....	2,243.11	2,352.85	1,857.67	1,493.25
Corral service.....	3,877.20	5,280.61	4,643.60	3,372.96
Janitor service.....	7,510.32	7,746.18	7,982.31	7,733.36
Utility service.....	2,953.28	3,067.84	3,247.61	2,162.79
Care of grounds.....	6,240.23	7,762.51	7,196.85	6,876.11
Mattress factory.....	2,074.45	1,258.56	1,135.30	878.06
Electric lighting.....	8,551.77	8,241.81	7,539.20	5,931.10
Division expense.....	4,124.92	3,968.07	3,662.51	4,555.88
Total, division cost.....	80,745.65	92,717.12	95,325.24	76,317.42
Equipment and tools.....	1,373.14	1,293.18	1,251.38	7,386.25
Furniture, mattresses, and stoves.....	143.07	328.88	12,600.53	794.89
Install hot water tanks in gold bachelor quarters.....	55.59	15.50		
Total, division cost.....	82,317.45	90,768.32	105,674.39	84,498.56

	March, 1920.	April, 1920.	May, 1920.	June, 1920.	Total, 1920.
Repairs to buildings.....	\$18,931.74	\$41,206.65	\$36,593.91	\$30,234.05	\$374,194.09
Fuel—coal and kindling.....	10,795.70	10,059.07	11,200.75	9,225.88	103,941.45
Grass cutting.....	1,753.27	1,173.26	2,838.22	4,145.25	37,084.57
Disposal of garbage.....	2,030.78	1,947.35	3,036.70	1,895.74	24,536.92
Repairs to furniture.....	3,903.41	5,369.55	5,741.28	6,247.62	54,704.65
Repairs to stoves.....	1,715.72	2,059.39	2,394.27	2,087.97	23,020.50
Corral service.....	3,487.88	3,935.84	5,633.79	6,188.79	55,024.66
Janitor service.....	9,327.84	9,824.26	8,604.71	9,441.34	99,396.97
Utility service.....	3,842.85	4,553.03	3,431.72	3,150.69	39,877.09
Care of grounds.....	8,293.33	8,051.31	8,210.69	8,925.00	89,246.81
Mattress factory.....	119.40	3,005.19	1,771.88	1,329.78	15,572.25
Electric lighting.....	8,822.70	2.29	8,051.46	15,365.38	93,038.08
Division expense.....	3,761.98	3,170.67	3,365.61	4,405.15	48,685.75
Total, division cost.....	76,786.60	94,357.86	98,331.23	102,642.64	1,058,323.79
Equipment and tools.....	1,456.19	2,481.47	370.41	660.21	12,399.18
Furniture, mattresses, and stoves.....	1,341.16	4,400.90	11,128.38	3,086.29	41,591.85
Install hot water tanks in gold bachelor quarters.....		2,540.15	1,370.85	330.68	7,032.37
Total, division cost.....	79,583.95	103,780.38	111,200.87	106,719.82	1,119,347.19

1 Credit.

TABLE No. 31.—*Statement of appropriation, receipts, and disbursements for fiscal year ended June 30, 1920.*

	Receipts.				Total available.
	Cash balance July 1, 1919.	Appropriations.	Collections.	Transfers between departments.	
Canal connecting Atlantic and Pacific Oceans.....	\$403,964.22		\$20,000.00		\$423,964.22
Panama Canal fund.....	177,094.63		56.35		177,150.98
Construction and equipment.....	2,517,644.81	\$729,898.00	83.34		3,247,626.15
Maintenance and operation.....	5,077,902.79	7,547,939.00	16,670,873.15	\$4,507,888.46	33,804,603.40
Sanitation.....	248,328.85	850,000.00	726,684.99		1,825,013.84
Civil government.....	51,335.40	852,000.00	56,805.18	45,092.88	1,005,233.46
Increase of compensation, 1918.....	782.20				782.20
Increase of compensation, 1919.....	493.40	18.33			511.73
Increase of compensation, 1920.....		35,000.00	.67		35,000.67
Total.....	8,477,546.30	10,014,855.33	17,474,503.68	4,552,981.34	40,519,886.65
Presenting launch Louise to French Government.....	159.01				159.01
Private act, Feb. 18, 1913, Oscar F. Lackey.....	1,500.00				1,500.00
Annual payment to Republic of Panama.....	250,000.00	250,000.00			500,000.00
Censorship of foreign mails, 1919.....	77,326.85				77,326.85
Regulating commerce, etc., 1919.....	38,380.18				38,380.18
Total.....	367,366.04	250,000.00			617,366.04

	Expenditures.			Cash balance June 30, 1920.
	Disbursements.	Transfers between departments.	Total.	
Canal connecting Atlantic and Pacific Oceans..	\$404.10	\$25,386.79	\$25,790.89	\$398,173.33
Panama Canal fund.....	844.48	44,314.42	45,158.90	131,992.08
Construction and equipment.....	522,898.38	920,740.85	1,443,639.23	1,803,986.92
Maintenance and operation.....	24,233,657.11		24,233,657.11	9,570,946.29
Sanitation.....	1,299,439.73	235,477.12	1,534,916.85	290,096.99
Civil government.....	794,633.92	58,152.39	852,786.31	152,447.15
Increase of compensation, 1918.....	782.20		782.20	
Increase of compensation, 1919.....	41.66		41.66	470.07
Increase of compensation, 1920.....	32,435.10		32,435.10	2,565.57
Total.....	26,885,136.68	1,284,071.57	28,169,208.25	12,350,678.40
Presenting launch Louise to French Government.....				159.01
Private act, Feb. 18, 1913, Oscar F. Lackey.....				1,500.00
Annual payment to Republic of Panama.....	250,000.00		250,000.00	250,000.00
Censorship of foreign mails, 1919.....		24,121.64	24,121.64	53,205.21
Regulating commerce, etc., 1919.....		16,813.38	16,813.38	21,566.80
Total.....	250,000.00	40,935.02	290,935.02	326,431.02

TABLE No. 32.—*Payments by fiscal officers.*

BY PAYMASTER.

Month.	Panama Canal payments.				Panama Railroad payments.			Grand total.
	Gold rolls.	Silver rolls.	Vouchers.	Total.	Pay rolls.	Vouchers.	Total.	
1919.								
July.....	\$393,417.27	\$507,856.34	\$663,757.71	\$1,765,031.32	\$359,533.52	\$536,204.68	\$895,743.20	\$2,660,774.52
August.....	653,010.05	574,041.47	681,852.27	1,908,886.79	391,526.39	694,840.85	1,086,367.24	2,995,254.03
September.....	695,868.17	573,161.15	949,125.68	2,188,155.00	448,006.03	922,100.21	1,370,106.24	3,558,261.24
October.....	631,043.89	552,035.60	722,480.73	1,906,160.22	373,830.67	965,002.35	1,368,833.02	3,274,993.24
November.....	669,877.08	572,178.38	810,879.55	2,052,935.01	350,730.90	742,367.09	1,102,097.99	3,155,033.00
December.....	673,638.61	499,479.96	674,593.05	1,847,711.62	421,610.19	1,008,344.44	1,429,954.63	3,277,666.25
1920.								
January.....	708,000.60	518,999.62	672,091.43	1,929,091.65	428,177.19	835,683.01	1,263,860.20	3,192,951.85
February.....	706,105.32	559,000.94	618,577.79	1,883,684.05	442,830.77	889,714.14	1,332,544.91	3,216,228.96
March.....	752,125.26	479,106.64	620,640.80	1,851,872.70	410,111.64	780,970.04	1,191,081.68	3,042,954.38
April.....	794,175.20	529,699.38	638,641.14	1,962,485.72	453,240.93	1,057,277.40	1,510,518.33	3,473,004.03
May.....	813,755.86	566,133.33	656,843.51	2,036,732.70	492,188.17	833,617.52	1,345,805.69	3,382,538.39
June.....	729,448.85	544,145.07	685,630.59	1,959,224.51	436,868.83	800,980.04	1,237,848.87	3,197,073.38
Total.....	8,391,066.16	6,505,810.88	8,395,094.25	23,291,971.29	5,017,655.23	10,117,106.77	15,134,762.00	38,426,733.29

TABLE No. 32.—*Payments by fiscal officers—Continued.*

BY COLLECTOR.

Month.	By disbursing clerk.	Clubhouse funds.	Trust funds.	Postal savings funds.	Money-order funds.	Interest.	Total.
1919.							
July.....	\$681,482.14	\$31,008.55	\$2,701.40	.....	\$152,125.59	\$637.92	\$184,772.06
August.....	515,856.07	30,324.47	1,172.17	.....	147,162.60	956.24	181,194.71
September.....	510,016.25	21,846.13	2,209.21	.....	107,600.00	838.73	131,457.03
October.....	630,192.31	23,653.02	1,407.02	.....	131,694.00	422.11	157,978.34
November.....	760,814.77	31,853.73	690.23	.....	123,551.30	356.60	157,170.85
December.....	576,803.79	26,446.77	.....	.....	8,867.00	463.08	36,467.08
1920.							
January.....	728,792.63	29,537.63	436.38	.....	5,550.00	522.34	36,846.35
February.....	622,458.08	21,450.53	788.64	.....	243,591.60	424.76	269,255.53
March.....	1,054,353.17	28,846.75	632.38	.....	209,800.00	825.40	240,124.53
April.....	697,636.10	24,563.33	1,038.31	.....	175,800.00	779.71	202,201.35
May.....	479,713.02	38,683.94	692.80	.....	197,413.50	1,133.66	237,925.90
June.....	902,554.92	36,367.51	41.48	.....	187,445.50	629.53	224,481.02
Total.....	\$8,180,673.25	347,586.36	11,850.02	50.00	1,691,901.29	7,987.08	2,059,374.75

TABLE NO. 33.—Statement of collections repaid to appropriations and to individuals and companies and collections deposited to miscellaneous receipts during the fiscal year ended June 30, 1920.

Department and classification.	Total, fiscal year 1920.	Department and classification.	Total, fiscal year 1920.
DEPARTMENT OF OPERATION AND MAINTENANCE.		SUPPLY DEPARTMENT—continued.	
Gross receipts from sales of other than Canal construction material..	\$366,152.19	Quartermaster—Continued.	
Electrical.....	556.25	Minor services, supplies, and property.....	\$111,179.45
Municipal engineering.....	8.32	Fuel oil.....	1,139,901.75
Marine.....	7.26	Las Cascadas silver settlement.....	378.49
Dams and backfill.....	6.00	Total, quartermaster.....	3,152,209.05
Balboa shops.....	2,028.04	Total, supply department.....	4,263,731.63
Quartermaster.....	568.66		
Building.....	8.10	ACCOUNTING DEPARTMENT.	
Washington office.....	.97	Overpayments.....	269.26
Undistributed expenditures.....	2,815.11	Lost property.....	658.65
Reserve for losses on obsolete stock..	92,578.19	Auditor.....	134.00
Clubs and playgrounds.....	9.56	Collector.....	115.75
Construction and repairs.....	1,362,456.91	Lost metal checks.....	383.62
Shop work.....	4,391,518.09	Cablegrams.....	2,009.65
Electric work.....	382,799.45	Proportion of salaries.....	206,012.32
Electric current.....	127,640.28	Rental of safety deposit box.....	529.60
Train service and use of rolling equipment.....	540.49	Minor services, supplies, and property.....	5,189.93
Tug service.....	309,793.90	Total, accounting department.....	215,302.78
Service of other floating equipment..	78,274.12		
Pilotage.....	73,203.00	EXECUTIVE DEPARTMENT.	
Wharfage.....	29,100.77	Executive, miscellaneous.....	6.50
Sales of water.....	111,503.86	Proportion of salaries.....	80,720.56
Operation and maintenance of Panama water works.....	226,719.65	Photographs and prints.....	1,343.07
Handling lines at locks.....	64,220.50	Motor car services.....	8,960.00
Handling lines at docks.....	1,108.00	Minor services, supplies, and property.....	161.03
Steamship inspection.....	2,824.50	Canal Record.....	54.49
Dredging.....	98,647.45	Lost photo identification checks.....	346.44
Minor services, supplies, and property.....	21,094.39	Annual report.....	.50
Dry dock, Balboa.....	121,681.71	Total, executive department.....	91,592.59
Dry dock, Cristobal.....	28,598.92		
United States invoices.....	21,505.61	CIVIL GOVERNMENT.	
Coupon books.....	50.00	Police and prisons.....	84.00
Reserves.....	1,876.96	School tuition.....	5,459.00
Total, department of operation and maintenance.....	7,919,897.21	Sale of school books.....	650.03
SUPPLY DEPARTMENT.		Police services.....	30,020.38
Subsistence:		Minor services, supplies, and property.....	8,922.08
Commissary coupons honored by Panama Canal.....	704,554.53	Postal services.....	1,325.00
Subsistence.....	2.25	Services of customs officers.....	762.00
Meals furnished.....	26,760.10	Total, civil government.....	47,222.49
Hotel Tivoli.....	191,206.55		
Hotel Aspinwall.....	30,983.98	MISCELLANEOUS.	
Line hotels.....	89,533.74	Land rental.....	17,987.50
Messes.....	16,428.11	Building rental.....	3,293.25
Minor services, supplies, and property.....	1,496.90	Land office expense.....	8,250.00
Laborers' meal tickets.....	50,556.42	Joint Commission transcripts.....	7.20
Total, subsistence.....	1,111,522.58	Equipment rental.....	46.68
Quartermaster:		Rental of pier.....	8,348.34
Audited bills.....	14.25	Boathouse rentals.....	359.94
Claims versus carriers.....	1,951.29	Total, miscellaneous.....	38,292.91
Quartermaster.....	1,263.30		
Material from stock.....	1,226,707.08	HEALTH DEPARTMENT.	
Rock, sand, and gravel, etc.....	21,480.40	Health.....	107.81
Printing and binding.....	50,124.59	Santo Tomas Hospital.....	707.47
Corral.....	138,832.89	Ancon Hospital:	
Rental of gold quarters.....	832.81	Fees.....	199,895.55
Rental of silver quarters.....	113,900.51	Mess.....	17,048.98
Garage rentals.....	8,607.84	Burials.....	5,819.77
Ancon nursery.....	5,683.52	Miscellaneous.....	2,362.12
Handling fuel oil.....	137,421.41		
Operation of stores.....	54,027.97		
Operation of quarters.....	139,900.00		

1 Credit.

TABLE No. 33.—*Statement of collections repaid to appropriations and to individuals and companies and collections deposited to miscellaneous receipts during the fiscal year ended June 30, 1920—Continued.*

Department and classification.	Total, fiscal year 1920.	Department and classification.	Total, fiscal year 1920.
HEALTH DEPARTMENT—continued.		COLLECTIONS FOR INDIVIDUALS AND COMPANIES.	
Colon Hospital:		Paymaster, various individuals and companies.....	\$706.82
Fees.....	\$24,248.91	Paymaster, Panama Railroad commissary books.....	29.34
Mess.....	4,155.22	Total, collections for individuals and companies.....	736.16
Miscellaneous.....	512.05		
Palo Seco Leper Asylum.....	23,147.04	RECAPITULATION.	
Dispensaries.....	13,659.02	Department of operation and maintenance.....	7,919,897.21
Quarantine:		Supply department:	
Subsistence.....	39,592.19	Subsistence.....	\$1,111,522.58
Other charges.....	8,006.97	Quartermaster.....	3,152,209.05
Sanitation:		Accounting department.....	4,263,731.63
Panama.....	11,142.97	Executive department.....	215,302.78
Colon.....	14,734.98		91,592.59
Zone.....	16,388.93	Total, maintenance and operation.....	12,490,524.21
Street cleaning:		Total, civil government.....	47,222.49
Panama.....	57,416.95	Total, sanitation.....	683,482.54
Colon.....	37,964.46	Total, miscellaneous.....	38,292.91
Corozal Hospital:		Total, repay to appropriations.....	13,259,522.15
Produce.....	12,650.90	Miscellaneous receipts.....	8,765,868.77
Pasturage.....	127.10	Individuals and companies.....	736.16
Burials.....	647.50	Grand total for year.....	22,026,127.08
Insane asylum.....	127,061.02	Special deposits on Isthmus.....	18,631,811.32
Sales from medical store.....	65,764.63	Special deposits in United States.....	2,287,783.21
District dentist, Ancon Hospital.....	320.00	Total, special deposits.....	20,919,594.53
Total, health department.....	683,482.54		
MISCELLANEOUS RECEIPTS.			
Gross receipts from sale of Canal construction material.....	12,034.19		
Miscellaneous credits due Canal construction accounts.....	6,520.00		
Water rentals, Panama and Colon.....	63,684.84		
Reserve for losses on obsolete stock.....	17,781.62		
Interest on bank balances.....	50,000.00		
Averages.....	3.06		
Miscellaneous.....	6,380.11		
Tolls.....	8,456,472.07		
Licenses and taxes.....	15,354.05		
Court fees and fines.....	27,694.45		
Postal receipts.....	109,117.48		
Miscellaneous, Canal Zone.....	826.90		
Total, miscellaneous receipts.....	8,765,868.77		

TABLE No. 34.—*Statement of transactions in the collector's special deposit account during the fiscal year ended June 30, 1920.*

IN THE UNITED STATES.

Month.	Deposits.	Panama Canal bills applied.	Payments to individuals and companies. ¹	Refunds.
1919.				
July.....	\$263,137.35	\$140,325.77	\$107,072.55	\$15,130.77
August.....	230,358.40	125,196.11	86,112.47	12,310.90
September.....	235,705.43	125,219.85	81,666.02	19,339.87
October.....	227,643.77	139,316.03	79,234.84	40,282.90
November.....	241,338.75	91,488.76	66,597.67	33,405.78
December.....	223,350.00	110,565.85	66,252.29	74,271.13
1920.				
January.....	211,453.75	118,397.95	79,996.11	43,882.72
February.....	124,002.70	146,635.08	53,395.43	28,333.58
March.....	128,864.75	91,400.51	34,938.46	51,851.29
April.....	196,779.31	54,293.63	32,057.77	24,210.40
May.....	63,249.00	29,932.22	62,613.45	773.83
June.....	108,900.00	71,112.04	40,121.84	16,510.79
Total.....	2,287,783.21	1,243,883.80	788,058.90	359,803.96

¹ Includes the Panama Railroad Company, All American Cables (Inc.), and other individuals and companies.

TABLE NO. 34.—*Statement of transactions in the collector's special deposit account during the fiscal year ended June 30, 1920—Continued.*

ON THE ISTHMUS.

Month.	Deposits.	Panama Canal bills applied.	Payments to individuals and companies.	Refunds.
1919.				
July.....	\$1,039,303.71	\$531,179.20	\$458,385.27	\$2,528.97
August.....	1,202,078.42	622,785.10	564,842.40	627.99
September.....	1,103,530.14	625,002.03	504,673.44	3,835.25
October.....	1,377,621.95	690,678.12	594,509.20	5,233.33
November.....	1,142,224.68	737,041.09	501,564.24	152.10
December.....	1,788,067.09	979,639.36	843,668.48	5,805.10
1920.				
January.....	1,850,566.29	1,066,110.04	611,935.43	6,566.06
February.....	1,405,275.51	858,211.27	623,736.49	4,023.56
March.....	2,041,244.19	1,214,185.48	716,975.17	2,095.27
April.....	1,957,484.87	1,309,282.83	584,204.76	29,490.63
May.....	2,059,526.38	1,399,056.77	615,899.73	1,887.82
June.....	1,664,888.09	1,070,406.42	616,642.55	33,201.83
Total.....	18,631,811.32	11,103,577.71	7,237,037.16	95,447.91

RECAPITULATION.

	In the United States.		On the Isthmus.	
On hand July 1, 1919.....	\$190,490.34	.....	\$244,903.86	.....
Deposits during year.....	2,287,783.21	.....	18,631,811.32	.....
Panama Canal bills applied.....	.....	\$1,243,883.80	.....	\$11,103,577.71
Payments to individuals and companies.....	.....	788,058.90	.....	7,237,037.16
Refunds.....	.....	359,803.96	.....	95,447.91
On hand June 30, 1920.....	.....	86,526.89	.....	440,652.40
Total.....	2,478,273.55	2,478,273.55	18,876,715.18	18,876,715.18

TABLE NO. 35.—*Statement of audited pay rolls on Isthmus during fiscal year 1920.*

	Total.	Salaries.	Wages.
Operation and maintenance:			
Executive office—			
Executive.....	\$20,875.60	\$20,875.60	.....
Record.....	64,180.89	63,395.66	\$785.23
Personnel.....	28,458.21	28,458.21	.....
Correspondence.....	38,233.56	38,233.56	.....
Property.....	29,532.90	29,532.90	.....
Statistics.....	14,411.87	14,411.87	.....
General.....	30,769.96	30,142.45	627.51
Timekeeping.....	93,102.09	93,102.09	.....
Shipping commissioner.....	27,771.11	27,771.11	.....
Motor cars.....	12,297.02	3,840.00	8,457.02
Clubs and playgrounds.....	138,335.04	123,901.75	14,433.29
Total, executive office.....	497,968.25	473,665.20	24,303.05
Engineer of maintenance—			
Lock operation—			
Atlantic.....	286,141.32	75,755.05	210,386.27
Pacific.....	500,017.21	119,387.40	380,629.81
Electrical.....	783,454.81	188,237.63	595,217.18
Dredging.....	980,145.00	232,250.75	747,894.25
Municipal engineering.....	1,249,780.95	355,897.90	893,883.05
Balboa incinerator.....	15,696.55	.....	15,696.55
Office engineer.....	49,617.51	48,486.49	1,131.02
Meteorology and hydrography.....	28,180.93	22,802.53	5,378.40
Surveys.....	39,277.53	24,038.52	15,239.01
Maintenance, Gatun dam.....	39,233.88	9,240.06	29,993.82
Total, engineer of maintenance.....	3,971,545.69	1,076,006.33	2,895,539.36

TABLE NO. 35.—*Statement of audited pay rolls on Isthmus during fiscal year 1920—Continued.*

	Total.	Salaries.	Wages.
Operation and maintenance—Continued.			
Marine division—			
Office.....	\$7,922.47	\$7,697.47	\$225.00
Port captain—			
Balboa.....	353,522.91	163,853.45	189,669.46
Cristobal.....	333,185.12	174,234.51	158,950.61
Lighthouse division.....	51,152.64	16,353.28	34,799.36
Total, marine division.....	745,783.14	362,138.71	383,644.43
Mechanical division—			
Balboa.....	3,002,003.76	310,438.03	2,691,565.73
Cristobal.....	852,217.31	60,249.32	791,967.99
Total, mechanical division.....	3,854,221.07	370,687.35	3,483,533.72
Supply department—			
Quartermaster—			
Office.....	39,525.28	39,525.28	.....
Storehouses.....	343,019.16	192,241.24	150,777.92
District quartermaster.....	905,883.30	235,883.77	669,998.53
Printing plant.....	88,614.64	21,879.24	66,744.40
Fuel-oil plants.....	50,064.19	9,885.59	40,178.60
Total, quartermaster.....	1,427,106.57	499,107.12	927,699.45
Subsistence.....	220,790.19	85,188.36	135,601.83
Total, quartermaster and subsistence.....	1,647,896.76	584,595.48	1,063,301.28
Accounting—			
Auditor.....	382,107.25	381,369.17	738.08
Paymaster.....	40,532.33	40,532.33	.....
Collector.....	36,921.71	36,921.71	.....
Total, accounting.....	459,561.29	458,823.21	738.08
Building.....	2,000,287.08	348,873.51	1,651,413.57
Fortifications.....	281,301.77	105,207.20	176,094.57
Injury and death—			
Old act.....	1,073.95	.....	1,073.95
New act.....	47,325.35	3,756.55	43,568.80
Total, operation and maintenance.....	13,506,964.35	3,783,753.54	9,723,210.81
Construction and equipment:			
Joint commission.....	39,265.41	39,265.41	.....
Special attorney and land office.....	18,262.16	18,262.16	.....
Total, construction and equipment.....	57,527.57	57,527.57	.....
Civil government:			
Civil affairs.....	38,736.43	38,736.43	.....
Posts.....	99,753.03	99,753.03	.....
Police and prisons.....	277,740.51	277,740.51	.....
Fire protection.....	80,138.24	80,138.24	.....
Schools.....	131,389.13	131,389.13	.....
District court.....	19,543.67	19,543.67	.....
District attorney.....	7,631.33	7,631.33	.....
Marshal.....	7,100.00	7,100.00	.....
Magistrate courts.....	13,125.32	13,125.32	.....
Censorship of mails.....	2,220.51	2,220.51	.....
Total, civil government.....	677,378.17	677,378.17	.....
Sanitation:			
Office.....	10,010.25	10,010.25	.....
Medical store.....	11,214.60	10,651.76	1,162.84
Ancon Hospital.....	341,358.14	282,127.11	59,231.03
Colon Hospital.....	53,006.62	47,066.66	5,939.96
Santo Tomas Hospital.....	12,460.46	12,460.46	.....
Palo Seco Leper Asylum.....	16,221.70	7,454.21	8,767.49
Dispensaries.....	31,922.80	31,267.80	655.00
Quarantine—			
Office.....	680.58	680.58	.....
Balboa.....	18,713.26	14,230.73	4,482.53
Cristobal.....	21,387.80	20,153.15	4,234.65
Bocas del Toro.....	1,915.99	1,915.99	.....
Corozal farm.....	45,697.63	36,980.45	8,717.18
Corozal Asylum.....	18,166.09	4,655.52	13,510.57
	48,091.77	39,392.08	8,699.69

TABLE NO. 35.—Statement of audited pay rolls on Isthmus during fiscal year 1920—Continued.

	Total.	Salaries.	Wages.
Sanitation—Continued.			
Health office—			
Panama.....	\$106,481.51	\$36,582.20	\$69,899.31
Colon.....	100,295.73	40,733.44	59,562.29
Zone sanitation.....	144,487.36	30,148.82	114,338.54
Total sanitation.....	939,414.66	588,930.76	350,483.90
Grand total.....	15,181,284.75	5,107,590.04	10,073,694.71

TABLE NO. 36.—Statement of accounts receivable registered during the fiscal year ended June 30, 1920.

Month.	Number of bills registered.	Total.	Against the Panama Railroad.	Against the Republic of Panama.	Against other departments of United States Government.	Against steamship companies.
1919.						
July.....	2,020	\$2,024,949.45	\$282,097.37	\$15,724.18	\$194,535.44	126,854.69
August.....	2,082	2,066,224.14	314,198.62	15,975.58	229,714.39	315,058.02
September.....	2,034	1,987,329.54	373,026.33	16,602.10	155,193.63	236,332.87
October.....	2,268	2,656,672.26	331,721.23	16,978.26	225,588.62	421,971.74
November.....	2,173	2,132,095.25	296,082.07	15,827.93	127,325.33	489,361.91
December.....	2,642	2,498,044.81	364,121.80	17,922.27	156,078.49	465,870.17
1920.						
January.....	2,742	2,626,202.53	386,100.41	20,410.50	158,574.37	554,266.33
February.....	2,480	2,224,944.83	387,497.78	18,687.45	168,310.43	373,379.74
March.....	2,639	2,671,329.49	320,758.79	17,738.96	168,996.39	768,052.80
April.....	2,652	2,647,575.65	502,618.20	36,407.14	216,957.04	578,117.71
May.....	2,543	2,569,154.60	378,083.76	19,106.18	213,741.33	501,433.17
June.....	2,550	2,550,209.09	387,391.17	25,811.39	319,924.91	541,032.54
Total.....	28,825	28,654,731.64	4,323,697.53	237,191.94	2,334,940.37	5,371,731.69
Total for year ended June 30, 1919.....	24,210	25,272,815.50	4,305,595.36	204,682.21	3,352,891.52	3,239,957.55

Month.	Against other individuals and companies.	Trust funds.		For various collections, hospitals and messes.	Tolls.	Repay to appropriations.
		For pay roll deductions.	Other collections.			
1919.						
July.....	\$414,246.50	\$446,452.69	\$609.00	\$5,944.42	\$538,485.16	\$1,039,302.60
August.....	105,157.83	470,703.48	12.50	5,956.76	609,446.96	985,661.20
September.....	125,710.28	485,042.11	50.00	6,378.23	588,993.99	913,143.44
October.....	513,726.58	479,750.62	189.13	5,438.34	661,307.74	1,506,550.48
November.....	140,058.89	492,156.74	.....	.....	571,282.38	1,065,254.88
December.....	241,920.94	348,369.37	.....	12,386.07	891,375.70	1,251,899.89
1920.						
January.....	315,932.90	424,146.53	.....	.....	766,771.49	1,424,971.89
February.....	181,496.37	372,454.95	.....	16,905.00	706,213.11	1,146,176.77
March.....	203,319.19	357,047.53	.....	6,393.53	829,022.30	1,357,500.99
April.....	169,966.90	328,123.95	.....	7,569.46	807,815.25	1,492,307.41
May.....	245,030.69	369,262.12	.....	8,009.81	834,487.54	1,354,989.94
June.....	182,539.83	375,294.39	.....	6,946.68	711,268.18	1,454,799.90
Total.....	2,839,106.90	4,948,804.48	860.63	81,928.30	8,516,469.80	14,992,559.39
Total for year ended June 30, 1919.....	3,256,972.24	4,474,814.79	6,925.16	64,699.24	6,181,637.43	14,393,511.72

TABLE NO. 37.—*Commissary books issued, fiscal year 1920.*

COUPON BOOKS ISSUED ON PAY ROLL DEDUCTION.

Month.	\$2.50 silver.		\$5 silver.		\$7.50 silver.	
	Number.	Value.	Number.	Value.	Number.	Value.
1919.						
July.....	21,553	\$53,882.50				
August.....	21,687	54,217.50				
September.....	20,687	51,717.50				
October.....	18,875	47,187.50				
November.....	20,884	52,210.00				
December.....	20,129	50,322.50				
1920.						
January.....	10,555	26,387.50				
February.....	7,131	17,827.50				
March.....	6,026	15,065.00	12,378	\$61,890.00		
April.....	5,750	14,375.00	42,381	211,905.00	9,137	\$68,527.50
May.....	2,240	5,600.00	45,903	229,515.00	10,612	79,590.00
June.....	2,302	5,755.00	44,867	224,335.00	12,918	96,885.00
Total.....	157,819	394,547.50	145,529	727,645.00	32,667	245,002.50

Month.	\$5 gold.		\$15 gold.		Total value.
	Number.	Value.	Number.	Value.	
1919.					
July.....	48,661	\$243,305.00	8,114	\$121,710.00	\$418,897.50
August.....	52,314	261,570.00	8,569	128,535.00	444,322.50
September.....	51,072	255,360.00	9,169	137,535.00	444,612.50
October.....	52,906	264,530.00	9,709	145,635.00	457,552.50
November.....	47,282	236,410.00	10,688	160,320.00	448,940.00
December.....	62,073	310,365.00	12,758	191,370.00	552,057.50
1920.					
January.....	57,264	286,320.00	11,208	168,120.00	480,827.50
February.....	54,329	271,645.00	11,410	171,150.00	460,622.50
March.....	34,139	170,695.00	11,751	176,265.00	423,915.00
April.....	1,521	7,605.00	12,073	181,095.00	483,507.50
May.....	1,526	7,630.00	11,839	177,585.00	499,920.00
June.....	1,674	8,370.00	11,819	177,285.00	512,630.00
Total.....	464,761	2,323,805.00	129,107	1,936,605.00	5,627,605.00

COUPON BOOKS SOLD FOR CASH.

Month.	\$2.50 silver.		\$5 silver.		\$7.50 silver.	
	Number.	Value.	Number.	Value.	Number.	Value.
1919.						
July.....	3,312	\$8,280.00				
August.....	3,244	8,110.00				
September.....	3,268	8,170.00				
October.....	2,837	7,092.50				
November.....	2,656	6,640.00				
December.....	2,859	7,147.50				
1920.						
January.....	2,235	5,587.50				
February.....	2,306	5,765.00				
March.....	2,160	5,400.00	26	\$130.00		
April.....	3,120	7,800.00	706	3,530.00	204	\$1,530.00
May.....	3,162	7,905.00	1,631	8,155.00	266	1,995.00
June.....	3,496	8,740.00	1,819	9,095.00	248	1,860.00
Total.....	34,655	86,637.50	4,182	20,910.00	718	5,385.00

TABLE No. 37.—*Commissary books issued, fiscal year 1920—Continued.*

COUPON BOOKS SOLD FOR CASH—Continued.

Month.	\$5 gold.		\$15 gold.		Total value.	Surcharge to steamship companies. ¹
	Number.	Value.	Number.	Value.		
1919.						
July.....	11,935	\$59,675.00	5,478	\$82,170.00	\$150,125.00	\$251.50
August.....	12,629	63,145.00	5,962	89,430.00	160,685.00	298.75
September.....	11,891	59,455.00	5,692	85,380.00	153,005.00	257.50
October.....	12,070	60,350.00	5,916	88,740.00	156,182.50	256.25
November.....	10,755	53,775.00	5,567	83,505.00	143,920.00	271.50
December.....	14,413	72,065.00	7,881	118,215.00	197,427.50	372.50
1920.						
January.....	12,093	60,465.00	6,590	98,850.00	164,902.50	297.50
February.....	12,018	60,090.00	7,020	105,300.00	171,155.00	220.00
March.....	13,632	68,160.00	8,150	122,250.00	195,940.00	316.25
April.....	13,083	65,415.00	8,332	124,980.00	203,255.00	250.00
May.....	12,429	62,145.00	8,265	123,975.00	204,175.00	358.75
June.....	12,254	61,270.00	7,873	118,095.00	199,060.00	272.50
Total.....	149,202	746,010.00	82,726	1,240,890.00	2,099,832.50	3,423.00

¹ 25 per cent surcharge added on coupon books sold to steamship companies for use in purchasing supplies for vessels—in effect Apr. 1, 1917.

TABLE No. 38.—*Commissary coupons honored at commissaries, hotels, messes, nursery, marine equipment, clubhouses, and Army and Navy Y. M. C. A. during the fiscal year ended June 30, 1920.*

Month.	Commissary.	Hotels and messes.	Ancon nursery.	Marine equipment.	Panama Canal clubhouses.	Army and Navy Y. M. C. A.	Total value.
1919.							
July.....	\$507,716.76	\$48,924.80	\$116.35	\$68.76	\$6,739.54	\$2,633.30	\$566,199.51
August.....	542,723.23	50,569.03	109.56	59.32	6,558.17	2,891.21	602,910.52
September.....	526,266.71	51,279.58	120.95	63.51	6,578.04	1,719.75	586,028.54
October.....	556,904.00	54,498.99	153.52	58.78	7,700.06	2,846.04	622,161.39
November.....	520,869.58	52,412.49	92.34	50.00	7,991.80	1,325.56	582,741.77
December.....	665,215.56	57,737.88	154.27	41.18	8,877.74	2,243.30	734,269.93
1920.							
January.....	598,362.04	58,303.50	161.81	66.84	9,016.65	1,349.13	667,259.97
February.....	532,294.94	55,115.49	144.16	57.75	8,841.43	1,336.64	597,790.41
March.....	562,455.79	60,022.74	102.93	47.71	8,488.43	3,174.50	634,292.10
April.....	622,750.33	61,850.47	91.63	30.98	9,723.39	1,282.40	695,729.20
May.....	632,267.69	61,319.63	96.93	39.90	10,821.43	1,877.65	706,423.23
June.....	615,413.43	59,837.21	138.04	41.67	10,131.50	2,144.72	687,706.57
Total.....	6,883,240.06	671,871.81	1,482.49	626.40	101,468.18	24,824.20	7,683,513.14

TABLE No. 39.—*Meal tickets issued to silver employees for which collections were made on pay rolls.*

Month.	10 cents.		30 cents.		40 cents.		Total value.
	Number.	Value.	Number.	Value.	Number.	Value.	
1919.							
July.....	201	\$20.10	588	\$176.40	17,761	\$7,104.40	\$7,300.90
August.....	112	11.20	260	69.00	16,671	6,668.40	6,748.60
September.....	36	3.60	264	79.20	13,824	5,529.60	5,612.40
October.....	36	3.60	322	96.60	13,290	5,316.00	5,416.20
November.....			1,337	554.80	7,094	3,547.00	4,081.80
December.....			1,461	584.40	7,296	3,648.00	4,232.40
1920.							
January.....			994	397.60	7,375	3,687.50	4,085.10
February.....			925	379.00	5,003	2,501.50	2,871.50
March.....			259	103.60	6,885	3,442.50	3,546.10
April.....			245	98.00	4,673	2,336.50	2,434.50
May.....							
June.....							
Total.....	385	38.50	6,625	2,509.60	99,872	43,781.40	46,329.50

TABLE NO. 40.—*Balances of miscellaneous trust funds on deposit with collector, June 30, 1920.*

Postal savings funds.....	\$459.00
Money order funds.....	702,924.40
Trust funds.....	6,950.90
Clubhouse funds.....	53,803.17
Interest.....	16,620.49
Total.....	789,757.96

TABLE NO. 41.—*Statement of money orders issued and paid by the Canal Zone and Canal Zone orders paid by other administrations, fiscal years 1907 to 1920, inclusive.*

Year.	Domestic money orders issued.		Money orders paid by Canal Zone post offices.			
	Number.	Value.	Martini- que.	Costa Rica.	United States.	Canal Zone.
1907.....	84,441	\$2,369,031.49			\$18,257.90	\$208,165.48
1908.....	153,457	4,686,684.98			33,378.45	1,017,750.97
1909.....	180,389	5,166,749.46			52,686.22	1,492,144.76
1910.....	207,220	5,228,553.60			60,470.77	1,331,568.20
1911.....	214,780	5,304,906.60	\$345.62		66,696.58	1,337,915.09
1912.....	227,680	4,915,077.26	375.63	\$85.70	60,898.69	1,280,397.88
1913.....	238,316	4,883,624.13	605.28	191.95	89,447.95	881,728.73
1914.....	198,828	4,029,364.97	268.85	375.38	88,533.43	776,265.68
1915.....	150,906	2,873,182.84	226.93	637.45	109,204.82	431,004.25
1916.....	147,042	2,417,033.83	3,047.64	445.19	129,302.20	289,011.70
1917.....	146,421	2,300,918.71	1,805.49	1,318.12	120,054.75	231,467.61
1918.....	143,250	2,138,328.69	1,821.08	507.00	211,461.81	224,067.94
1919.....	118,500	1,963,218.27	1,456.04	255.40	325,954.47	209,704.77
1920.....	106,539	2,055,764.98		946.47	290,493.63	195,390.52
Total.....	2,317,769	50,332,439.81	9,952.56	4,762.66	1,686,341.67	9,906,573.59

DEPOSIT ORDERS ISSUED IN LIEU OF POSTAL SAVINGS.

1915.....	19,652	\$1,075,570.00				\$722,680.00
1916.....	24,054	1,101,190.00				1,103,430.00
1917.....	27,054	1,481,845.00				1,136,115.00
1918.....	24,772	1,244,335.00				1,441,225.00
1919.....	22,118	1,145,460.00				1,225,025.00
1920.....	18,583	1,143,225.00				1,043,080.00
Total.....	136,233	7,191,625.00				6,671,555.00
Grand total.....	2,454,002	57,524,064.81	\$9,952.56	\$4,762.66	\$1,686,341.67	16,578,128.59

Year.	Canal Zone money orders paid by—				Cash remitted to United States Post Office Department.
	Martini- que.	Costa Rica.	United States.	Canal Zone.	
1907.....			\$1,581,251.91	\$208,165.48	\$1,884,000.00
1908.....			2,875,719.61	1,017,750.97	2,055,000.00
1909.....			3,583,419.57	1,492,144.76	3,392,000.00
1910.....	\$2,267.60		4,068,650.16	1,331,568.20	3,535,000.00
1911.....	6,022.08		3,725,996.12	1,337,915.09	4,422,249.17
1912.....	8,176.95	\$1,062.40	3,521,511.95	1,280,397.88	3,580,000.00
1913.....	9,646.65	3,946.10	4,286,948.31	881,728.73	3,468,000.00
1914.....	11,684.18	4,634.53	4,070,694.55	776,265.68	3,401,000.00
1915.....	6,183.64	1,250.55	2,699,533.06	1,153,684.25	3,053,407.08
1916.....	5,979.45	1,172.02	2,102,740.27	1,392,441.70	2,125,043.89
1917.....	3,500.97	1,420.12	1,960,097.67	1,367,582.61	1,676,500.00
1918.....	2,446.50	1,767.15	2,021,706.75	1,665,282.94	1,655,000.00
1919.....	2,995.11	1,531.50	1,776,375.55	1,434,729.77	1,671,000.00
1920.....	1,412.00	1,814.10	1,877,402.85	1,238,470.53	1,501,000.00
Total.....	60,315.13	17,698.47	40,152,048.33	16,578,128.59	38,419,200.14
Grand total.....	60,315.13	17,698.47	40,152,048.33	16,578,128.59	38,419,200.14

¹ Deposit money orders paid by Canal Zone included.

SUMMARY.

Total Canal Zone orders issued.....	\$57,524,064.81	Money order funds:	
Total Canal Zone orders paid.....	56,808,190.32	Cash on deposit with collector, Panama Canal.....	\$702,924.40
Total Canal Zone orders out- standing unpaid.....	715,874.29	Cash due from postmas- ters.....	\$24,167.74
Due United States by the Canal Zone.....	10,804.75	Less amount of fees in- cluded.....	76.02
Due Costa Rica by the Canal Zone..	268.03		24,091.72
Due Martinique by the Canal Zone..	49.00		
Overages.....	20.05		
	727,016.12		727,016.12

TABLE No. 42.—Postal Service—Statement showing the monthly money order business of the Canal Zone postal service during the fiscal year ended June 30, 1920.

Month.	Money orders issued, including deposit money orders.		Interest paid on deposit money orders.	Money orders paid by the Canal Zone post offices.			Canal Zone money orders paid by—		
	Num- ber.	Amount.		United States.	Costa Rica.	Canal Zone. ¹	Marti- nique.	Costa Rica.	United States.
1919.									
July.....	9,081	\$221,760.47	\$637.92	\$15,936.27	\$5.00	\$110,968.55	.....	\$263.00	\$130,240.36
August.....	10,139	219,721.76	956.24	25,035.14	50.00	126,304.91	.....		159,906.41
September.....	10,013	244,573.64	838.73	21,043.98	.....	109,001.60	\$751.50	249.00	136,739.63
October.....	10,122	241,694.28	422.11	19,600.64	.....	75,740.52	117.00		129,505.76
November.....	10,642	229,863.09	356.60	18,194.15	.....	76,788.63	22.00		123,983.39
December.....	13,250	289,724.85	463.08	24,039.77	33.00	89,582.57	227.00	175.60	140,343.03
1920.									
January.....	10,616	264,086.51	522.34	22,333.66	30.00	73,249.86	135.00	.....	166,973.81
February.....	9,945	275,802.09	424.76	21,838.08	50.25	75,976.69	68.50	.....	157,456.43
March.....	11,721	327,360.21	825.40	26,867.82	18.00	118,842.70	42.00	348.00	256,608.79
April.....	9,828	294,028.74	779.71	32,232.84	6.25	113,556.05	32.00	.....	159,693.01
May.....	9,753	281,842.16	1,133.66	24,197.75	104.00	137,709.22	17.00	.....	138,685.20
June.....	10,012	278,532.18	626.53	39,183.55	649.97	132,749.23	.....	778.50	175,267.03
Total.....	125,122	3,198,989.98	7,987.08	290,493.63	946.47	1,238,470.53	1,412.00	1,814.10	1,877,402.85

¹ Including deposit money orders.

TABLE No. 43.—Postal Service—Statement of audited revenues, fiscal years 1907 to 1920, inclusive.

Year.	Receipts.						
	Miscella- neous.	Money order fees.	Interest on money order funds.	Stamp sales.	Box rent.	Newspaper postage.	Total revenue.
1907.....		\$9,832.65		\$54,803.79			\$64,636.44
1908.....		19,309.14		72,708.67		\$0.87	92,018.68
1909.....		21,720.93		74,241.87		85.53	96,048.33
1910.....		22,980.96		83,765.60		81.50	103,828.06
1911.....		23,457.98		82,583.21		28.51	103,071.70
1912.....		22,889.93		87,497.21		144.24	110,531.38
1913.....		23,366.31		100,599.15		318.84	124,284.30
1914.....		19,408.44		90,792.63		463.67	110,664.74
1915.....		13,169.55		75,202.29	\$2,973.65	988.50	92,333.99
1916.....		12,878.29		76,337.08	5,029.50	1,410.39	95,655.26
1917.....	\$1,207.59	12,371.28	\$12,884.57	74,474.98	8,100.00	1,703.89	110,742.31
1918.....	1,344.75	11,918.35	32,940.22	83,939.74	8,147.30	1,825.88	140,115.74
1919.....	2,513.25	10,424.16	25,746.20	81,723.76	8,268.20	2,553.88	131,029.45
1920.....	1,951.64	10,207.59	22,141.38	87,096.72	8,776.55	1,782.53	131,956.41
Total.....	6,817.23	233,935.56	93,712.37	1,125,768.70	41,295.20	11,387.73	1,512,916.79

TABLE No. 44.—*Postal Service—Statement of postal revenues, fiscal year ended June 30, 1920.*

Month.	Receipts.						Total revenue.
	Miscellaneous.	Money-order fees.	Interest on money-order funds.	Stamp sales.	Box rent.	News-paper postage.	
1919.							
July.....	\$63.84	\$695.38	\$2,614.21	\$6,175.13	\$581.50	\$178.42	\$10,308.48
August.....	153.39	809.95	866.21	5,614.26	48.20	139.32	7,633.33
September.....	153.87	822.54	.....	6,087.30	1,326.65	164.51	8,554.87
October.....	251.66	796.65	4,965.78	6,103.35	656.95	135.83	12,910.22
November.....	63.28	\$32.84	1,027.55	6,198.60	22.50	132.73	8,277.50
December.....	171.62	1,093.23	785.99	8,883.71	1,489.45	180.20	12,604.20
1920.							
January.....	185.52	\$29.06	2,288.10	7,905.41	539.75	132.21	11,880.05
February.....	174.73	785.09	1,273.58	7,429.44	6.25	140.63	9,809.72
March.....	172.88	1,033.28	1,221.60	8,241.26	1,428.00	190.13	12,287.15
April.....	200.09	\$27.97	4,557.95	7,543.59	577.65	137.40	13,844.65
May.....	201.57	\$21.67	1,246.22	7,863.27	25.95	123.71	10,282.39
June.....	157.19	\$59.93	1,294.19	9,051.40	2,073.70	127.44	13,563.85
Total.....	1,951.64	10,207.59	22,141.38	87,096.72	8,776.55	1,782.53	131,956.41

TABLE No. 45.—*Postal Service—Statement of postal-savings payments and deposit money-order transactions (in lieu of postal-savings system) for fiscal year ended June 30, 1920.*

Month.	Postal-savings certificates.		Deposit money orders.		
	Balance July 1, 1919.	Paid.	Balance July 1, 1919.	Issued.	Paid.
1919.					
July.....	\$509.00	.....	\$419,925.00	\$84,540.00	\$94,715.00
August.....	.....	\$50.00	.....	87,015.00	107,185.00
September.....	.....	.....	.....	78,910.00	94,175.00
October.....	.....	.....	.....	86,790.00	61,965.00
November.....	.....	.....	.....	72,450.00	63,000.00
December.....	.....	.....	.....	78,700.00	73,320.00
1920.					
January.....	.....	.....	.....	102,120.00	56,255.00
February.....	.....	.....	.....	117,540.00	63,400.00
March.....	.....	.....	.....	111,790.00	99,440.00
April.....	.....	.....	.....	118,195.00	95,630.00
May.....	.....	.....	.....	108,495.00	119,695.00
June.....	.....	.....	.....	96,680.00	114,300.00
Balance unpaid June 30, 1920.....	.....	459.00	.....	.....	520,070.00
Total.....	509.00	509.00	419,925.00	1,143,225.00	1,563,150.00

TABLE NO. 46.—Statement of income, bureau of clubs and playgrounds, July 1, 1919, to June 30, 1920.

	Ancon.	La Boca.	Balboa.	Pedro Miguel.	Paraiso.	Gatun.	Gatun, silver.
Soda fountains.....	\$21,273.22	\$9,752.32	\$41,229.47	\$4,449.64	\$6,316.21	\$10,520.13	\$6,550.81
Cigars and candy.....	25,062.60	11,273.97	34,855.14	3,869.39	5,027.38	8,328.34	5,443.04
Salable merchandise.....	5,294.10	.....	19,266.65	234.31	2.41	1,734.61	.....
Moving pictures.....	4,183.30	599.65	20,976.67	2,069.00	616.85	2,878.35	984.65
Billiards.....	1,741.42	442.72	2,000.04	345.40	708.91	447.56	1,350.43
Bowling.....	1,283.12	63.90	1,892.40	384.22	82.75	845.43	.....
Entertainments.....	746.15	.....	4,136.20	217.10	.....	589.65	133.60
Tournaments.....	167.50	1.00	78.00	27.75	7.75	.....	.....
Playgrounds.....	124.69	613.75	90.00	.....	82.10	.....	422.25
Swimming pool.....	.....	.....	6,624.98	.....	.....	.....	.....
Tennis clubs.....	154.75	13.34	490.60	87.50	7.00	232.00	.....
Library deposits.....	5.60	7.50	3.60	.....	.50	29.00	.....
Rentals and interest.....	178.61	182.00	467.50	59.50	120.00	60.00	195.50
Membership.....	36.00	.....	36.00	.....	.....	.....	.....
Activities.....	2.15	151.95	137.82	31.15	.....	22.64	22.50
Supplies and equipment.....	6.79	14.81	135.90	.....	.....	.....	.....
Maintenance and general expenses.....	13.02	1.15	87.19	.....	.....	1.15	3.50
Total.....	60,273.02	23,118.06	132,598.16	11,774.96	12,971.86	25,679.86	15,106.28

	Cristobal.	Cristobal, silver.	Red tank.	Balboa boat-house.	Bureau clubs and playgrounds stock.	General secretary.	Total.
Soda fountains.....	\$17,719.53	\$9,367.65	\$4,651.61	\$406.90	.....	.....	\$132,237.49
Cigars and candy.....	18,370.58	21,235.62	3,911.47	695.57	.....	.....	138,073.10
Salable merchandise.....	3,210.92	.....	.....	1,393.95	.....	.....	31,136.95
Moving pictures.....	2,724.25	830.65	884.50	.....	.....	.....	36,747.87
Billiards.....	1,868.89	1,510.67	845.50	.....	.....	.....	11,261.04
Bowling.....	1,374.18	66.90	.....	.....	.....	.....	5,992.90
Entertainments.....	187.90	.....	48.85	.....	.....	.....	6,059.45
Tournaments.....	.....	.....	.....	.....	.....	.....	282.00
Playgrounds.....	.....	1,338.07	81.20	.....	.....	.....	2,752.06
Swimming pool.....	.....	.....	.....	.....	.....	.....	6,624.98
Tennis clubs.....	234.25	29.00	.....	.....	.....	.....	1,248.44
Library deposits.....	3.20	15.50	.50	.....	.....	.....	56.40
Rentals and interest.....	128.49	146.83	108.50	930.80	.....	\$1,534.17	4,111.90
Membership.....	16.00	2.00	.....	.....	.....	.....	90.00
Activities.....	37.20	.....	9.00	448.25	.....	.....	862.66
Bureau clubs and playgrounds stock.....	.....	.....	.....	.....	\$47,452.07	.....	47,452.07
Supplies and equipment.....	.....	.....	.....	.....	.....	.....	157.50
Maintenance and general expenses.....	19.10	.....	.....	5.45	.....	.....	130.56
Boat dues.....	.....	.....	.....	964.90	.....	.....	964.90
Transfer funds, Balboa Yacht Club surplus.....	.....	.....	.....	876.40	.....	.....	876.40
Total.....	45,893.99	34,542.89	10,541.13	5,722.22	47,452.07	1,534.17	427,118.67

TABLE NO. 47.—Statement of expenses, bureau of clubs and playgrounds, July 1, 1919, to June 30, 1920.

	Ancon.	La Boca.	Balboa.	Pedro Miguel.	Paraiso.	Gatun.	Gatun silver.
Soda fountain.....	\$21,045.42	\$7,763.27	\$41,378.47	\$4,487.94	\$5,455.52	\$11,373.59	\$5,546.27
Cigars and candy.....	20,524.81	9,449.87	21,230.41	3,501.57	4,193.13	7,454.76	4,875.73
Salable merchandise.....	4,490.28	.....	17,334.54	196.42	.....	1,599.07	.....
Moving pictures.....	4,049.14	764.70	15,559.66	2,097.40	684.63	3,253.90	1,189.75
Billiards.....	1,739.91	454.58	2,362.19	619.56	285.57	799.91	772.77
Bowling.....	1,340.05	142.50	2,188.74	404.07	117.80	780.26	.....
Entertainments.....	711.65	1.76	5,108.05	248.77	3.15	639.80	151.81
Tournaments.....	128.45	11.70	67.99	14.17	3.24	.....	.....
Playgrounds.....	216.14	270.70	412.96	14.00	155.11	80.69	411.70
Swimming pool.....	.....	.....	7,429.93	.....	.....	.....	.....
Tennis clubs.....	209.06	6.17	482.24	16.58	.....	62.54	5.87
Office help.....	\$21.49	140.00	979.06	518.75	180.38	776.00	45.00
Maintenance and general expense.....	3,638.33	1,521.23	7,844.56	1,091.43	623.51	1,853.10	1,292.23
Books and periodicals.....	336.47	129.05	384.14	187.80	93.55	209.97	94.55
Supplies and equipment.....	1,874.42	23.36	3,779.04	1,679.34	99.16	2,246.97	8.89
Refunds.....	.....	6.50	3.00	7.50	.50	1.50	.....
Activities.....	\$11.39	175.53	1,109.09	272.84	129.85	739.45	190.46
Bureau of clubs and playgrounds stock.....	.....	.....	.....	.....	.....	.....	.....
Rentals.....	7.75	.....	6.50	.....	.....	.....	.....
Membership.....	56.82	.....	60.57	.....	.....	.....	.....
Total.....	62,001.58	20,860.92	135,721.14	15,358.14	12,025.10	31,871.51	14,585.03

	Cristobal.	Cristobal silver.	Red Tank.	Balboa boat-house.	Bureau clubs and playgrounds stock.	General secretary.	Total.
Soda fountain.....	\$19,645.08	\$8,048.72	\$4,355.26	\$302.79	.....	.....	\$129,402.33
Cigars and candy.....	16,284.84	17,496.16	3,521.06	539.31	.....	.....	117,071.65
Salable merchandise.....	3,387.31	.....	.....	1,469.25	.....	.....	28,476.87
Moving pictures.....	2,969.29	1,011.86	886.87	.....	.....	\$4.20	32,471.40
Billiards.....	1,856.23	762.04	529.87	.....	.....	.....	10,182.63
Bowling.....	1,485.00	82.79	.34	.....	.....	.....	6,551.55
Entertainments.....	370.59	5.78	39.06	.....	.....	.....	7,280.42
Tournaments.....	.....	.....	.....	.....	.....	.....	225.55
Playgrounds.....	26.15	909.21	75.03	.....	.....	.....	2,571.69
Swimming pool.....	.....	.....	.....	18.00	.....	.....	7,447.93
Tennis clubs.....	200.18	21.44	.....	.....	.....	.....	1,004.08
Office help.....	823.40	194.74	60.00	26.69	.....	.....	4,565.51
Maintenance and general expense.....	11,569.62	972.58	688.69	1,163.92	.....	434.34	32,693.54
Books and periodicals.....	275.13	129.27	108.56	.....	.....	12.00	1,960.49
Supplies and equipment.....	3,200.29	5.26	110.74	173.97	.....	.....	13,201.44
Refunds.....	14.53	5.50	.50	.....	.....	.....	39.53
Activities.....	434.12	146.15	103.13	436.24	.....	75.00	4,623.25
Bureau of clubs and playgrounds stock.....	.....	.....	.....	.....	\$52,034.13	.....	52,034.13
Rentals.....	.50	.....	.....	.....	.....	.....	14.75
Boat dues.....	.....	.....	.....	652.12	.....	.....	652.12
Membership.....	12.09	.....	.....	.....	.....	.....	129.48
Total.....	62,564.35	29,791.50	10,479.11	4,782.29	52,034.13	525.54	452,600.34

TABLE NO. 48.—*Summary of income and expenses, bureau of clubs and playgrounds, July 1, 1919, to June 30, 1920.*

	Ancon.	La Boca.	Balboa.	Pedro Miguel.	Paraíso.	Gatun.	Gatun silver.
Soda-fountain inventory, July 1, 1919.....	\$242.73	\$204.89	\$586.96	\$193.98	\$243.71	\$264.51	\$138.65
Cigars and candy inventory, July 1, 1919.....	1,543.99	340.86	1,135.87	219.92	345.01	280.97	122.52
Salable merchandise inventory, July 1, 1919.....	806.45	.....	1,624.31	98.05	2.37	68.62	.....
Total expenditures, fiscal year 1920.....	62,001.58	20,860.92	135,721.14	15,358.14	12,025.10	31,871.51	14,585.03
Earnings, fiscal year 1920.....	¹ 1,574.67	2,280.38	¹ 1,024.22	¹ 3,436.43	650.73	¹ 6,057.63	¹ 1,040.03
Total.....	63,020.08	23,687.05	138,044.06	12,433.66	13,266.92	26,427.98	15,886.23
Soda-fountain inventory, June 30, 1920.....	340.96	190.73	566.42	246.47	39.78	199.77	195.80
Cigars and candy inventory, June 30, 1920.....	1,715.69	378.26	3,004.77	333.68	255.28	407.25	584.15
Salable merchandise inventory, June 30, 1920.....	690.41	.....	1,964.71	78.55	.....	141.10	.....
Total income, fiscal year 1920.....	60,273.02	23,118.06	132,508.16	11,774.96	12,971.86	25,679.86	15,106.28
Total.....	63,020.08	23,687.05	138,044.06	12,433.66	13,266.92	26,427.98	15,886.23

	Cristobal.	Cristobal silver.	Red tank.	Balboa boat-house.	Bureau of clubs and playgrounds stock.	General secretary.	Total.
Soda-fountain inventory, July 1, 1919.....	\$305.68	\$136.00	.....	.....	.....	.....	\$2,317.11
Cigars and candy inventory, July 1, 1919.....	823.83	351.38	\$45.04	.....	.....	.....	5,209.39
Salable merchandise inventory, July 1, 1919.....	427.95	.....	.....	.....	.....	.....	3,027.75
Bureau of clubs and playgrounds stock inventory, July 1, 1919.....	.....	.....	.....	.....	\$7,294.83	.....	7,294.83
Total expenditures, fiscal year 1920.....	62,564.35	29,791.50	10,479.11	\$4,782.29	52,034.13	\$525.54	452,600.34
Earnings, fiscal year 1920.....	¹ 15,468.85	5,026.04	461.35	¹ 1,186.89	710.61	¹ 1,008.63	¹ 15,197.14
Total.....	48,652.96	35,304.92	10,985.50	5,969.18	60,039.57	1,534.17	455,252.28
Soda-fountain inventory, June 30, 1920.....	571.05	117.09	104.49	34.64	.....	.....	2,607.20
Cigars and candy inventory, June 30, 1920.....	1,624.02	644.94	339.88	103.05	.....	.....	9,390.97
Salable merchandise inventory, June 30, 1920.....	563.90	.....	.....	109.27	.....	.....	3,547.94
Bureau of clubs and playgrounds stock inventory, June 30, 1920.....	.....	.....	.....	.....	12,587.50	.....	12,587.50
Total income, fiscal year 1920.....	45,893.99	34,542.89	10,541.13	5,722.22	47,452.07	1,534.17	427,118.67
Total.....	48,652.96	35,304.92	10,985.50	5,969.18	60,039.57	1,534.17	455,252.28

¹ Loss.

TABLE NO. 49.—*Bureau of clubs and playgrounds, balance sheet, June 30, 1920.*

ASSETS.		LIABILITIES.	
Cash on hand:		Surplus:	
Secretaries' balances.....	\$7,303.83	To June 30, 1919.....	\$78,021.25
Deposited with collector..	53,803.17	Profit, current fiscal year ¹	15,197.14
	\$61,107.00		\$62,824.11
Inventories:		Accounts payable:	
Soda fountain.....	2,607.20	Audited vouchers.....	38,374.50
Cigars and candy.....	9,390.97	Panama Railroad Com-	
Salable merchandise.....	3,547.94	pany (swimming pool).....	200.00
Bureau clubs and play-			38,574.50
grounds stock.....	12,587.50		
	28,133.61		
Accounts receivable:			
Registered bills.....	10,131.50		
Gatun soldiers.....	6.44		
Balboa Gun Club.....	2,020.06		
	12,158.00		
Total.....	101,398.61	Total.....	101,398.61

¹ Loss.TABLE NO. 50.—*Statements of amounts paid under Executive order No. 1902, dated Mar. 20, 1914, as compensation to employees injured and on account of deaths of employees injured while directly engaged in actual work with The Panama Canal and Panama Railroad Company from July 1, 1919, to June 30, 1920, and a statement of amounts paid under act of Sept. 7, 1916, as compensation to employees injured while in the performance of duty with The Panama Canal and the Panama Railroad Company from July 1, 1919, to June 30, 1920.*

	Payments under the act of Sept. 7, 1916.		Payments under the Executive order of Mar. 20, 1914, injury.
	Injury.	Death.	
Executive office.....			
Motor cars, Panama Canal.....	\$3.60		
Clubs and playgrounds.....	457.98	\$45.00	
Lock operation division.....	511.90		
Electrical division.....	2,073.25	725.49	
Dredging division.....	2,932.47	229.68	
Municipal engineering.....	13.78		
Office engineer and survey.....	11.55		
Meteorology and hydrography.....	324.27		
Marine division.....	7,108.06	765.32	
Mechanical division.....	567.96		
Quartermaster's division.....	340.94		
Storehouses.....	84.13		
Printing plant.....	92.01		
Fuel-oil plant.....			
Subsistence.....			
Accounting department.....	7,776.55	1,493.11	
Building division.....	252.99	145.98	
Fortification.....	1,502.47		
Health department.....	900.77		
Civil government.....			
Land office and special attorney.....	588.66		
Maintenance of way.....			
Panama Railroad stables and baggage transfer.....			
Motor cars, Panama Railroad.....			
Coaling plants.....	3,449.42		
Hotels.....	13.05		
Commissary division.....	1,015.11	452.33	
Plantations.....	65.50		
Cattle steamers.....	154.23		
Cattle ranches.....	1,094.36	525.87	
Poultry farm.....			
Hog farm.....	3.00		
Dairy farm.....	24.33		
Railroad transportation.....	2,735.80		
Receiving and forwarding agencies.....	8,699.28	113.72	
Dams and back fills.....	28.43		
Terminals.....			\$1,073.95
Total.....	42,828.85	4,496.50	1,073.95

TABLE NO. 51.—Statement of amounts paid under the act of May 30, 1908, to employees as compensation on account of deaths of employees injured in the course of employment; amounts paid under act of Feb. 24, 1909, for injuries lasting 15 days or less; amounts paid under Executive order of Feb. 26, 1913; amounts paid under Executive order No. 1902, dated Mar. 20, 1914; and amounts paid under act of Sept. 7, 1916, covering period from Aug. 1, 1908, to June 30, 1920.

	Injuries.	Deaths.	Under act of Feb. 24, 1909.	Total.
Total payments, by fiscal years:				
Aug. 1, 1908, to June 30, 1909.....	\$32,355.71	\$3,682.79	\$8,225.16	\$44,263.66
July 1, 1909, to June 30, 1910.....	96,810.33	21,053.22	16,010.30	133,873.85
July 1, 1910, to June 30, 1911.....	168,416.23	35,248.39	49,957.80	253,622.42
July 1, 1911, to June 30, 1912.....	166,620.21	37,534.68	55,838.25	259,993.14
July 1, 1912, to June 30, 1913.....	150,943.79	23,792.02	49,335.91	224,071.72
July 1, 1913, to June 30, 1914.....	111,240.75	41,015.34	33,704.92	185,961.01
July 1, 1914, to June 30, 1915.....	17,703.40	14,268.97	.....	31,972.37
July 1, 1915, to June 30, 1916.....	168.00	1,206.00	.....	1,374.00
July 1, 1916, to June 30, 1917.....	.....	545.40	.....	545.40
July 1, 1917, to June 30, 1918.....	.....	.....	.....	.....
July 1, 1918, to June 30, 1919.....	163.54	.....	.....	163.54
Total.....	744,421.96	178,346.81	213,072.34	1,135,841.11
Payments under Executive order of Feb. 26, 1913.....	.....	.....	.....	13,227.62
Payments under Executive order of Mar. 20, 1914:				
Apr. 1, 1914, to June 30, 1914.....	4,283.82	.....	.....	4,283.82
July 1, 1914, to June 30, 1915.....	41,871.91	43,017.71	.....	84,889.62
July 1, 1915, to June 30, 1916.....	32,341.85	33,321.07	.....	65,662.92
July 1, 1916, to June 30, 1917.....	9,748.10	11,400.95	.....	21,149.05
July 1, 1917, to June 30, 1918.....	.....	740.18	.....	740.18
July 1, 1918, to June 30, 1919.....	1,547.34	.....	.....	1,547.34
July 1, 1919, to June 30, 1920.....	1,073.95	.....	.....	1,073.95
Payments under provisions of contracts between Panama Canal and contractors.....	334.18	.....	.....	334.18
Payments under special acts of Congress.....	.....	.....	.....	39,418.37
Total.....	.....	.....	.....	1,368,168.16
Amounts paid to Panama Railroad employees:				
Apr. 1, 1914, to June 30, 1914.....	770.61	.....	.....	770.61
July 1, 1914, to June 30, 1915.....	10,275.45	2,300.42	.....	12,575.87
July 1, 1915, to June 30, 1916.....	9,056.66	3,330.24	.....	12,386.90
July 1, 1916, to June 30, 1917.....	3,146.70	.....	.....	3,146.70
July 1, 1917, to June 30, 1918.....	185.98	.....	.....	185.98
Payments made by the Panama Railroad Company for injuries incurred prior to Apr. 1, 1914.....	.....	.....	.....	614.60
Payments under the act of Sept. 7, 1916:				
Sept. 7, 1916, to June 30, 1917.....	15,845.04	13,961.57	.....	29,806.61
July 1, 1917, to June 30, 1918.....	42,396.54	3,848.77	.....	46,245.31
July 1, 1918, to June 30, 1919.....	93,412.48	10,798.06	.....	104,210.54
July 1, 1919, to June 30, 1920.....	42,828.85	4,496.50	.....	47,325.35
Grand total.....	.....	.....	.....	1,625,436.63

TABLE NO. 52.—*Number of injuries, by extent of disability, for each division or department.*

	Number of injuries resulting in temporary disability of—								Total temporary disability.	Pending cases.
	Total injuries.	Death.	Permanent disability.	1 to 3 days.	4 to 7 days.	8 to 14 days.	15 to 28 days.	Over 28 days.		
Executive office.....	2	.....	.....	1	.....	1	.....	.....	2	.....
Motor cars, Panama Canal.....	2	.....	.....	2	.....	.....	.....	.....	2	.....
Clubs and playgrounds.....	2	.....	.....	.....	2	.....	.....	.....	2	.....
Lock operation division.....	101	1	1	69	9	5	11	5	99	.....
Electrical division.....	69	.....	.....	44	8	7	5	4	68	1
Dredging division.....	231	1	.....	151	24	25	16	11	227	3
Municipal engineering.....	433	3	4	245	49	68	46	15	423	3
Office engineer and surveys.....	3	.....	.....	.....	2	1	.....	.....	3	.....
Meteorology and hydrography.....	2	.....	.....	1	.....	.....	1	.....	2	.....
Marine division.....	50	.....	.....	29	6	8	4	3	50	.....
Mechanical division.....	806	.....	4	500	117	84	53	37	791	11
Quartermaster division.....	77	3	.....	31	15	11	10	5	72	2
Storehouses.....	99	.....	.....	57	11	17	9	5	99	.....
Printing plant.....	16	.....	.....	10	2	1	2	1	16	.....
Fuel oil plant.....	4	.....	.....	4	.....	.....	.....	.....	4	.....
Subsistence.....	35	.....	1	17	6	7	4	.....	34	.....
Accounting department.....	3	.....	.....	2	.....	.....	.....	.....	3	.....
Building division.....	474	3	2	288	80	48	26	22	464	5
Fortification division.....	55	.....	.....	36	6	3	8	2	55	.....
Health department.....	134	.....	.....	82	20	12	17	3	134	.....
Civil government.....	14	.....	.....	3	3	4	3	1	14	.....
Maintenance of way.....	115	1	.....	62	20	12	10	7	111	3
Panama Railroad stables and baggage transfer.....	1	.....	.....	1	.....	.....	.....	.....	1	.....
Coaling plants.....	279	2	.....	178	26	28	21	18	271	6
Hotels.....	7	.....	.....	1	2	2	1	.....	6	1
Commissary division.....	287	.....	.....	191	37	30	14	11	283	4
Plantations.....	4	.....	.....	1	.....	.....	2	1	4	.....
Cattle steamers.....	7	.....	.....	4	.....	1	1	1	7	.....
Cattle ranches.....	261	3	.....	88	43	59	35	23	248	10
Hof farm.....	1	.....	.....	.....	1	.....	.....	.....	1	.....
Dairy farm.....	18	.....	.....	8	5	4	1	.....	18	.....
Railroad transportation.....	24	.....	1	10	7	4	2	.....	23	.....
Receiving and forwarding agencies.....	744	.....	2	350	113	128	89	50	730	12
Dams and backfills.....	108	.....	.....	102	4	1	.....	.....	108	.....
Total.....	4,468	17	15	2,568	618	572	392	225	4,375	61

TABLE NO. 53.—*Nature of nonfatal cases, by department or division.*

	Bruises, contusions, abrasions.	Burns and scalds.	Concussions.	Cuts, punctures, lacerations.	Amputations.	Dislocations.	Fractures.	Sprains and strains.		Eye injuries.	All other.	Total.
								Hernia.	Other.			
Executive office.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	2
Motor cars, Panama Canal.	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	2
Clubs and playgrounds.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	2
Lock-operation division.....	38	5	.....	28	1	1	3	2	9	12	1	100
Electrical division.....	26	5	.....	23	1	1	.....	1	6	.....	.....	69
Dredging division.....	75	14	.....	106	5	1	6	4	11	.....	.....	230
Municipal engineering.....	139	9	.....	213	4	1	7	7	29	17	4	430
Office engineer and surveys.	2	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	3
Meteorology and hydrography.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	2
Marine division.....	25	5	.....	13	.....	.....	2	1	3	1	.....	50
Mechanical division.....	320	61	2	238	10	3	32	7	50	80	3	806
Quartermaster's division.....	30	.....	.....	26	2	.....	7	.....	4	4	1	74
Storehouses.....	36	3	.....	40	1	.....	4	.....	10	3	2	99
Printing plant.....	4	1	.....	10	.....	.....	.....	.....	1	.....	.....	16
Fuel-oil plant.....	2	.....	.....	1	.....	.....	.....	.....	1	.....	.....	4
Subsistence.....	13	9	.....	9	1	.....	.....	3	3	.....	.....	35
Accounting department.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	3
Building division.....	180	5	3	202	2	2	14	4	32	25	2	471
Fortification division.....	26	3	.....	17	.....	.....	3	.....	4	1	1	55
Health department.....	28	7	.....	78	2	.....	3	2	4	2	8	134
Civil government.....	4	1	.....	3	.....	.....	3	1	1	1	.....	14
Maintenance of way.....	43	3	.....	52	1	.....	5	1	6	3	.....	114
Panama Railroad stables and baggage transfer.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Coaling plants.....	134	15	1	81	2	.....	8	4	8	24	.....	277
Hotels.....	2	1	.....	2	.....	.....	.....	1	1	.....	.....	7
Commissary division.....	107	13	.....	119	2	.....	6	1	26	11	2	287
Plantations.....	1	.....	.....	3	.....	.....	1	.....	.....	.....	.....	4
Cattle steamers.....	4	1	.....	1	.....	.....	1	.....	.....	.....	.....	7
Cattle ranches.....	48	1	.....	181	1	.....	8	.....	6	7	6	258
Hog farm.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Dairy farm.....	12	1	.....	5	.....	.....	.....	.....	.....	.....	.....	18
Railroad transportation.....	7	5	.....	8	.....	1	2	.....	1	.....	.....	24
Receiving and forwarding agencies.....	380	13	3	235	1	1	41	4	58	6	2	744
Dams and backfills.....	35	1	.....	56	.....	.....	.....	.....	4	6	6	108
Total.....	1,725	182	9	1,756	36	11	156	40	280	218	38	4,451

TABLE NO. 54.—*Nature of injury in nonfatal cases, with the amount of expenditures in each class.*

Nature of injury.	Total injuries.	Expenditure.
Bruises, contusions, and abrasions.....	1,725	\$4,369.26
Burns and scalds.....	182	1,005.50
Cuts, punctures, and lacerations.....	8	22.75
Other.....	1,757	6,516.15
Total.....	3,672	
Sprains and strains:		
Hernia.....	40	659.18
Back.....	115	317.00
Ankle, foot, or leg.....	73	193.29
Wrist or arm.....	51	155.67
Other.....	41	45.17
Total.....	320	
Dislocation.....	11	91.81
Fractures:		
Arm.....	26	1,933.06
Hand.....	9	107.06
Finger and fingers.....	13	1,466.33
Leg.....	34	3,109.13
Foot.....	30	1,393.95
Toe or toes.....	19	275.48
Ribs.....	7	138.69
Skull.....	2	202.88
Other.....	16	565.83
Total.....	156	
Eye injuries:		
Loss of both eyes.....		
Loss of one eye.....		
Partial loss of vision.....		
Other.....	218	388.53
Total.....	218	
Amputations:		
Right arm.....	1	119.44
Right hand.....	1	
Right finger.....	10	179.83
Right fingers, 2 or more.....	4	1,038.04
Left arm.....		
Left hand.....		
Left finger.....	9	160.32
Left fingers, 2 or more.....	4	11.35
Leg.....	2	433.51
Foot.....		
Toe or toes.....	5	231.72
Total.....	36	
Other temporary and permanent injuries:		
Poisoning and occupational diseases.....	37	48.31
Loss of hearing, one ear.....	1	44.44
Total.....	38	
Grand total.....	4,451	25,123.68

TABLE NO. 55.—*Cause of injuries.*

	Executive office.	Motor cars, Panama Canal.	Clubs and playgrounds.	Lock operation division.	Dams and backfills.	Electrical division.	Municipal engineering.	Dredging division.	Office engineer, surveys.	Metecorology and hydrography.	Marine division.	Mechanical division.
Animals, kicks, bites, falls from.....				3	4		2					...
Blow of hammer or other object.....				1	1	2	15	10				35
Caught between two hard bodies.....				15	4	5	57	43		2	6	125
Collapse of material.....					1	1	10	5				19
Contact with machinery.....		1		1			3	10			6	25
Contact with gear.....												1
Contact with rough edge or surface.....			1	9	8	5	42	19			3	55
Contact with sharp instruments or splinters, etc.....				5	40		36	17	1		4	30
Derailment of locomotive or cars.....		1				3	7					1
Explosion of boilers, pipes, gases.....								2				4
Explosion of powder or dynamite.....							1					
Electric current.....				2		4						5
Fall from elevations.....				10	1	8	11	19			7	65
Fall from cars.....					2	1	8	1				1
Fall into excavations.....				2	3	1	5				1	4
Fall on even surface.....			1	5	8	1	14	9			4	25
Hot metals, liquids, inflammable or corrosive substance.....				3	1	2	8	8			2	57
Lifting, pushing, pulling.....	1			7	7	4	30	12			3	40
Operating hand car or speeder.....						1	1					
Struck by flying object.....	1			17	10	5	25	19			6	100
Struck by engine, cars, collision.....				1	1	7	9					3
Struck by falling body.....				11	4	6	62	17	2		3	128
Struck by swinging or loose object.....				3	3		12	8			2	25
Stepping on nails, thorns, etc.....				3	3	9	59	25			1	17
Using simple hand tools.....				2	7	4	8	5				35
Vapors, gases, or poisonous substance.....							5	1			2	6
Resisting or making arrest, fighting.....							3	1				
Drowning.....				1								
Total.....	2	2	2	101	108	69	433	231	3	2	50	806

TABLE NO. 55.—*Cause of injuries*—Continued.

	Quartermaster.	Storehouses.	Printing plant.	Fuel oil plant.	Subsistence.	Accounting.	Building division.	Fortification division.	Health department.	Civil government.	Maintenance of way.	Stables and baggage transportation.
Animals, kicks, bites, falls from.....	3	1					3	1	9	2		
Blow of hammer or other object.....							14	2	2		1	
Caught between two hard bodies.....	7	24	1	2			39	7	11		33	
Collapse of material.....	1		1	2			26				2	
Contact with machinery.....	8		6				6		1	1		1
Contact with gear.....												
Contact with rough edge or surface.....	2	6		4			28	3	5		6	
Contact with sharp instruments or splinters, etc.....	7	11	2				31	8	46		10	
Derailment of locomotive or cars.....							2				2	
Explosion of boilers, pipes, gases.....				1			1			1		
Explosion of powder or dynamite.....								1				
Electric current.....											1	
Fall from elevations.....	5	1		1	3	1	61	4	6		6	
Fall from cars.....						1	5	4	3		3	
Fall into excavations.....							1		4			
Fall on even surface.....	7	2	1	1	9		19	6	9	2	1	
Hot metals, liquids, inflammable or corrosive substance.....		3	1		8		4	2	8		1	
Lifting, pushing, pulling.....	3	7			1		20	2	2	1	6	
Operating hand car or speeder.....		1										
Struck by flying object.....	6	6				1	33	4	3	1	12	
Struck by engine, cars, collision.....	5	3	1				4		1		4	
Struck by falling body.....	11	22	1		1		76	6	4	3	12	1
Struck by swinging or loose object.....		6			1		11		1		2	
Stepping on nails, thorns, etc.....	7	5	1	1	1		72	2	11	1	8	
Using simple hand tools.....	2		1				17	3	5		4	
Vapors, gases or poisonous substance.....	1	1					1		2		1	
Resisting or making arrest, fighting.....	1		1		2				1	2		
Drowning.....	1											
Total.....	77	99	16	4	35	3	474	55	134	14	115	1

TABLE NO. 55—Cause of injuries—Continued.

	Coaling plants.	Hotels.	Commissary.	Plantations.	Cattle steamers.	Cattle ranches.	Hog farm.	Dairy farm.	Railroad transportation.	Receiving and forwarding agency.	Total.
Animals, kicks, bites, falls from.....			6			11		7			52
Blow of hammer or other object.....	5		1			1					95
Caught between two hard bodies.....	29	2	31		2	2		2	3	182	634
Collapse of material.....	5		1							1	75
Contact with machinery.....	9		8							5	90
Contact with gear.....	1		1								3
Contact with rough edge or surface.....	26	1	23			16		1	2	64	329
Contact with sharp instruments or splinters, etc.....	9		52	1		141	1	5	3	28	488
Derailment of locomotive or cars.....			1		1					3	16
Explosion of boilers, pipes, gases.....				1							14
Explosion of powder or dynamite.....											3
Electric current.....	2									1	15
Fall from elevations.....	28	1	13		3	3			2	20	279
Fall from cars.....			5		1	1			3	19	57
Fall into excavations.....	2		2	1		2					28
Fall on even surface.....	10		22			15		1	2	26	200
Hot metals, liquids, inflammable or corrosive substance.....	17	1	14			2		1	2	10	155
Lifting, pushing, pulling.....	10	1	20			1				34	212
Operating hand car or speeder.....											3
Struck by flying object.....	26		7			1			2	14	299
Struck by engine, cars, collision.....	2		5								71
Struck by falling body.....	75	1	42		1	42			1	185	717
Struck by swinging or loose object.....	12		14			5			1	56	162
Stepping on nails, thorns, etc.....	5		14	1		13					271
Using simple hand tools.....	1		2			1				1	98
Vapors, gases or poisonous substance.....	1		2			3			3	2	31
Resisting or making arrest, fighting.....	3		1			1		1		5	22
Drowning.....	1										3
Total.....	279	7	287	4	7	261	1	18	24	744	4,468

TABLE NO. 56.—Receipts, issues, and transfers of stores and purchases charged to divisions during fiscal year 1919-20.

Month.	Receipts by—			Issued by—			Purchases direct to divisions.
	Purchases.	Transfers.	Manufacture.	Issues.	Transfers.	Sales.	
July.....	\$456,196.47	\$337,151.93	\$47,825.47	\$607,455.19	\$205,054.74	\$116,702.52	\$139,527.88
August.....	333,816.41	317,678.34	42,014.33	659,204.13	217,076.46	91,649.87	171,592.34
September.....	674,447.31	439,916.26	36,146.34	637,492.43	290,317.02	75,314.31	214,383.91
October.....	575,250.08	539,115.52	36,326.03	707,332.67	294,644.92	83,737.25	205,610.37
November.....	419,535.93	342,002.64	41,983.09	569,777.41	283,563.05	53,293.30	202,063.10
December.....	622,000.10	478,202.95	64,647.62	961,036.82	361,026.53	109,533.6	130,858.15
January.....	765,309.01	814,293.06	33,798.64	989,219.74	431,153.64	204,709.13	147,243.84
February.....	503,189.74	485,600.06	37,696.72	622,269.74	222,621.65	144,200.92	230,742.32
March.....	505,229.51	392,574.46	41,637.11	795,200.95	286,002.60	229,598.84	431,242.41
April.....	391,119.50	917,488.87	32,860.78	765,543.95	280,426.72	245,662.12	232,759.43
May.....	625,448.76	743,641.67	35,924.74	715,532.81	329,494.99	365,334.55	373,051.64
June.....	803,496.72	583,828.91	77,213.35	882,699.12	379,384.85	201,453.28	499,789.60
Total.....	6,675,129.54	6,391,494.67	528,074.22	8,913,064.96	3,580,767.17	1,921,189.70	2,978,864.99
Regular stock in storehouses, July 1, 1919 ..			6,312,836.28	Regular stock in storehouses July 1, 1920.....			5,354,786.34
Obsolete material in obsolete storehouses July 1, 1919.....			150,212.70	Obsolete material in obsolete storehouses July 1, 1920.....			27,365.11
Material in hands of divisions July 1, 1919..			879,022.45	Material in hands of divisions July 1, 1920.....			546,618.22

TABLE NO. 57.—Comparative statement of store balance, July 1, 1919, and July 1, 1920.

Quartermaster store (by commodities).	July 1, 1919.	July 1, 1920.
1. Air-brake material	\$32,143.82	\$29,356.41
2. Alcohol	22,429.07	9,977.73
3. Alum and other chemicals for filtering water	237.18	856.11
4. Arms and ammunition		¹ 35.21
5. Asbestos and magnesia and compounds	1,223.14	81.65
6. Asphalt, petroleum residue and mineral tar, pitch, and rosin	12,187.58	2,501.54
7. Blocks, chain and tackle	9,187.86	11,614.27
8. Boilers, steam	1,332.93	904.36
9. Bolts, nuts, rivets, and washers	102,759.21	80,473.89
10. Books, educational, library, and reference	11.00	98.98
11. Bricks, building, fire and paving	9,830.90	6,546.25
12. Brooms, mops, dusters, and scrub brushes	8,888.62	7,837.29
13. Building material (not otherwise specified)	23,022.01	58,445.52
14. Buoys	950.27	949.28
15. Cars, hand, push, and inspectors', and velocipedes	1,203.08	1,885.98
16. Castings, rough—brass and copper	38,345.42	34,962.85
17. Castings, rough—iron and steel	91,067.35	88,098.20
18. Cement, Portland (including bags)	20,633.22	102,982.16
19. Chain	21,519.82	10,266.49
20. Cleanings and toilet supplies	12,007.35	4,225.40
21. Construction equipment, accessories, and supplies	82,746.72	80,386.87
22. Containers, nonexpensible (except cement bags)	56,958.18	96,997.59
23. Conveying and lifting equipment, accessories, and parts	112,293.62	103,741.02
24. Diving outfits and parts	68.42	1,190.33
25. Drafting supplies	631.76	167.26
26. Drugs, chemicals, vaseline, naphtha, and benzine	58,692.77	18,750.57
27. Educational supplies	78.42	
28. Ejectors, injectors, lubricators, pop valves, blow-off cocks, water gauges and parts	43,381.40	33,047.61
29. Electrical equipment, accessories and parts (ex lock machinery)	368,510.76	478,937.18
30. Electricians' supplies (not otherwise specified)	1,591.60	1,241.67
31. Engines, steam, and parts	6,343.02	6,328.87
32. Explosives and blasting batteries and parts	61,379.79	30,086.94
33. Farm, plantation, and cattle ranch implements, supplies and parts	8,330.19	303.76
34. Fire preventing and fire fighting equipment, supplies and parts (not hose)	3,781.17	16,132.64
35. Fittings, pipe and valve	118,247.27	142,141.56
36. Flags (railroad excluded)	4,196.33	3,513.50
37. Floating equipment, parts for	801,967.42	538,636.15
38. Forage, feed, and bedding	16,480.13	6,581.62
39. Fuel, coal, anthracite	6,076.32	2,971.40
40. Fuel, coal, bituminous	2,775.07	2,263.97
41. Fuel, crude oil	205.88	558.47
42. Furnace and foundry supplies (except pig iron)	66,325.10	52,302.24
43. Furniture and equipment (office) and parts	4,396.55	5,094.81
44. Furniture, other than office	13,555.20	11,873.32
45. Gasoline	95,023.12	102,706.14
46. Gauges, steam and vacuum	517.81	1,069.11
47. Glass, window, sash and plate	33,752.42	37,929.72
48. Glue, gelatine, rubber, and asbestos cement	3,732.56	2,952.21
49. Hair, feathers and moss	¹ 1,926.78	16,785.52
50. Hardware (except nails and spikes)	176,312.10	170,011.08
51. Harness, saddlers', and other corral equipment and supplies	6,505.32	8,662.17
52. Hose	58,436.67	25,636.25
53. Instruments, equipment, and supplies, surgical, medical and laboratory	2,371.74	3,080.80
54. Iron, in pigs	30,569.66	24,736.71
55. Iron and steel, in bars and sheets (ex G. I. roofing)	570,239.11	250,191.60
56. Iron and steel, reinforcing	35,500.20	22,650.82
57. Ladders and scaffolds	106.04	357.91
58. Laundry apparatus, accessories and parts	826.99	455.97
59. Lawn mowers and rakes (other than hand operated)	105.33	780.95
60. Leather and belting	13,574.96	21,327.79
61. Lime, plaster, and clay	8,593.21	5,023.56
62. Lumber, pine, fir, and redwood	186,124.12	220,292.68
63. Lumber, fancy	52,616.99	43,957.46
64. Magazines and newspapers	136.22	
65. Metals, in pigs (excepting iron)	23,381.92	11,528.63
66. Metals, in sheets and bars (excepting iron), and steel	79,784.54	63,419.67
67. Meters, current, and parts	3,234.25	6,180.83
68. Meters, water, oil, and air	1,037.77	1,094.90
69. Nails and spikes	39,941.53	53,004.52
70. Office supplies and stationery	3,630.96	4,300.00
71. Oilcloth and linoleum	4,053.01	10,509.04
72. Oils, illuminating	28,574.39	¹ 3,888.25
73. Oil, lubricating, and greases, graphite, welding and cutting compounds	86,605.33	56,724.94
74. Packing, caulking, and gaskets	57,860.70	56,752.54
75. Packing receptacles (expensible) and other packing supplies	6,023.85	4,227.79
76. Paints and painters' supplies, putty, varnishes, shellacs, linseed oils, drier, filler, white and red lead, etc.	272,119.46	318,459.33
77. Paper, packing	1,040.26	23,106.89
78. Photographic supplies and parts		16.50

¹ Indicates credit balances caused by credit to storehouses for issues of these articles, the charges for which were not received until after closing of books for the current fiscal year.

TABLE NO. 57.—*Comparative statement of store balance, July 1, 1919, and July 1, 1920—Continued.*

Quartermaster store (by commodities).	July 1, 1919.	July 1, 1920.
84. Piling.....	\$6,533.43	\$9,764.31
85. Pipe and fittings (vitrified).....	12,149.13	4,339.55
86. Pipe and tubing (metal).....	142,819.08	118,748.27
87. Plumbing material (not otherwise specified).....	39,171.50	45,475.35
88. Police equipment (except arms and ammunition).....	36.70	.....
89. Polishing and abrading supplies.....	5,234.60	8,515.22
90. Printing-plant equipment and supplies (not including paper).....	377.13	.....
91. Production equipment, accessories, and parts.....	53,162.00	59,253.13
92. Pumps, and parts, including electric.....	16,570.18	15,656.25
93. Rails.....	13,491.57	9,665.99
94. Recreation equipment and parts.....	757.56	639.52
95. Refrigerating equipment, accessories, and parts.....	2,638.32	8,537.19
96. Refrigeration supplies.....	4,192.03	26,535.37
ROLLING STOCK, PARTS FOR.		
106. Locomotives.....	71,195.79	64,825.56
107. Freight and passenger train cars.....	253,427.90	122,789.44
108. Motor cars, railroad.....	9,524.13	9,516.30
109. Rope.....	78,246.54	72,604.39
110. Rubber products (except packing and belting and tires).....	352.85	1,715.47
111. Sashes, doors, blinds, molding, and capping, screening, strips, etc.....	7,820.50	26,648.05
112. Scales and parts.....	928.36	1,207.84
113. Scientific equipment and parts (except surgical and surveying).....	1,489.70	1,615.55
114. Screening, bronze and copper.....	8,145.81	45,287.33
115. Searchlights and lighthouse equipment and supplies.....	529.29	611.15
116. Signal material (automatic).....	15,873.43	12,850.53
117. Stone, sand, gravel, and slate.....	1,329.94	14,915.13
118. Subsistence equipment.....	14,920.16	19,828.75
119. Subsistence supplies.....	1,497.65	1,608.35
120. Surveying instruments and supplies.....	33.37	33.37
121. Tanks.....	426.65	386.15
122. Telegraph and telephone equipment, accessories, and parts.....	27,395.70	28,892.00
123. Tents and parts, flies, and tarpaulins.....	2,970.39	3,848.86
124. Thermometers and barometers.....	1,022.07	2,667.61
125. Ties, cross and switch.....	1,331.93	1,631.50
126. Tiles, building.....	10,186.41	6,757.36
127. Tools, miscellaneous.....	76,572.27	72,960.29
128. Tools, pneumatic and electric.....	28,413.27	30,139.11
129. Track material (other than rails and ties).....	21,661.53	22,241.37
130. Trucks, warehouse, etc.....	1,424.86	2,473.14
131. Tubes, boiler and condenser.....	83,821.64	88,943.54
132. Vehicles (animal-drawn), accessories, and parts.....	6,290.94	7,255.64
133. Vehicles (motor-drawn), accessories, and parts (railroad motor cars and fire equipment excluded).....	86,565.88	92,979.15
134. Waste.....	33,824.84	10,124.63
135. Water cranes and standpipes.....	118.13	118.13
136. Wearing apparel and sewing supplies.....	1,385.81	2,873.52
137. Wire and wire cables.....	142,106.41	106,757.42
138. Wire, covered and coated.....	167,998.67	153,419.68
139. Woven products and fabrics.....	68,024.60	58,891.86
140. Steel, structural.....	3,267.62	123,428.23
141. Lock machinery and parts.....	1,718.73	1,718.73
142. Dry-dock parts (not otherwise specified).....	.....	273.30
143. Obsolete material.....	36,049.69	69,470.71
144. Magnets, carburetors, and parts.....	.....	4,455.51
147. Lumber, native.....	19,218.32	20,255.48
148. Concrete blocks for breakwater repairs.....	40,498.34	40,498.34
149. Fuel, Diesel oil.....	2,203.95	5,875.86
151. Obsolete material.....	3,366.20	2,498.39
152. Obsolete equipment.....	.....	2,450.00
153. Marine hardware.....	.....	39,650.19
Total, quartermaster's stores.....	5,741,090.38	5,354,786.34
Miscellaneous district quartermaster's stores.....	13,713.54	10,681.05
Fuel-oil store.....	285,744.32	25,959.10
Medical store.....	153,234.82	131,021.15
Stationery store.....	21,301.09	22,472.85
Panama Canal Press.....	97,700.58	109,605.55
Total.....	6,312,784.73	5,654,526.01

¹Indicates credit balances caused by credit to storehouses for issues of these articles, the charges for which were not received until after closing of books for the current fiscal year.

TABLE No. 58.—*Supply department, commissary branch, cost of material and supplies purchased and sold during the year ended June 30, 1920.*

Class.	On hand June 30, 1919.	Purchases.	On hand June 30, 1920.	Sold.
Groceries.....	\$572,132.48	\$2,838,233.80	\$597,464.26	\$2,812,902.02
Hardware.....	161,110.59	339,836.51	133,747.80	361,199.30
Dry goods.....	901,634.71	1,575,331.94	982,720.41	1,494,246.24
Boots and shoes.....	255,296.87	436,227.53	318,960.85	372,563.55
Cold storage.....	186,251.83	1,854,227.62	152,461.37	1,888,018.08
Tobacco.....	66,361.51	337,959.87	38,752.85	365,568.53
Raw material.....	625,957.60	2,809,165.87	408,608.18	3,026,515.29
Total.....	2,768,745.59	10,190,983.14	2,638,715.72	10,321,013.01

¹ Cattle, hogs, and poultry in amount of \$2,044,035.16.

PERCENTAGE OF SURCHARGE EARNED ON COST.

Class.	Sold.	Earned surcharge.	Percentage earned on cost.
Groceries.....	\$2,812,902.02	\$381,983.57	13.58
Hardware.....	361,199.30	102,251.08	28.31
Dry goods.....	1,494,246.24	494,663.94	33.10
Boots and shoes.....	372,563.55	101,563.25	27.26
Cold storage.....	1,888,018.08	479,817.49	25.41
Tobacco.....	365,568.53	204,391.47	55.91
Raw material.....	3,026,515.29	34,823.76	1.15
Total.....	10,321,013.01	1,799,494.56	17.43

LOCATION OF PURCHASES.

United States.....	\$6,605,167.59
Foreign.....	312,077.03
Costa Rica.....	92,295.43
Haiti.....	1,232.14
Central and South America and West Indies.....	96,596.54
Cattle industry.....	2,182,118.63
Local purchases.....	787,663.32
Panama Canal.....	113,832.46
Total.....	10,190,983.14

CLASSIFICATION BY COMMODITIES.

Groceries.....	\$2,838,233.80
Hardware.....	339,836.51
Dry goods.....	1,575,331.94
Boots and shoes.....	436,227.53
Cold storage.....	1,854,227.62
Tobacco.....	337,959.87
Raw material.....	2,809,165.87
Total.....	10,190,983.14

TABLE No. 59.—*Supply department, commissary branch, statement showing distribution of sales and selling value for the year ended June 30, 1920.*

	1919	1920	Increase.
To United States Government.....	\$2,395,162.73	\$2,161,118.46	\$234,044.27
Panama Canal.....	1,458,762.36	1,558,588.17	99,825.81
Steamships.....	838,931.79	1,119,852.93	280,921.14
Panama Railroad.....	480,223.34	411,480.95	68,742.39
Individuals and companies.....	205,751.93	272,866.75	67,114.82
Coupon Sales.....	5,858,814.18	6,883,513.80	1,024,699.62
Gross revenue from sales.....	11,237,646.33	12,407,421.06	1,169,774.73
Supplied for equipment:			
Commissaries for expense.....	173,561.79	181,849.04	8,287.25
General expense.....	1,205.55	1,023.09	182.46
Plants for expense.....	88,514.78	131,108.20	42,593.42
Total.....	263,282.12	313,980.33	50,698.21
Loss by condemnation, shrinkage, etc.....	118,817.40	166,282.50	47,465.10
Loss by clerical errors, pilfering, etc.....	66,973.39	63,544.59	3,428.80
Total.....	185,790.79	229,827.09	44,036.30
Grand total.....	11,686,719.24	12,951,228.48	1,264,509.24

APPENDIX F.

REPORT OF THE EXECUTIVE SECRETARY, EXECUTIVE DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *August 8, 1920.*

SIR: The report of this department for the fiscal year contains, in addition to an outline of the work of the various divisions and bureaus, statements of the working force; studies of increase in living costs; a summary of wage adjustments; reports of the courts, which are included in the executive department for administrative purposes only; and references to other matters in which this department acts in behalf of the whole organization.

POPULATION OF THE CANAL ZONE.

An enumeration of the population of the Canal Zone was made in January, 1920, in accordance with instructions from the Bureau of the Census. The results were published in The Panama Canal Record of April 28, 1920. It has been the practice to have an enumeration made each June by the division of police. This is less elaborate as to classification than the decennial census; but it is accurate, and inasmuch as it is made each year (thus giving an annual check on the constantly changing population) it is used as the basis for the vital statistics of the Canal Zone. The summary of the police census was published in The Panama Canal Record of July 28, 1920. It shows the following:

	Americans.		All others.		Americans.			All others.			Total.
	Men.	Em- ploy- ees.	Men.	Em- ploy- ees.	Wom- en.	Em- ploy- ees.	Chil- dren.	Wom- en.	Em- ploy- ees.	Chil- dren.	
Balboa district.....	{ 2,410	2,305	.....	2,577	.....	315	.....	.....	60	.....	5,237
Cristobal district.....	{ 1,138	1,128	.....	3,115	.....	1,853	1,924	1,770	2,432	.....	13,504
Prisoners.....	{ 1	1	.....	3,056	.....	54	612	966	14	.....	4,252
	{ 24	.....	.....	3,196	.....	553	.....	.....	1,530	.....	7,995
		.....	.....	19	.....	.....	.....	.....	.....	.....	20
		.....	.....	127	.....	.....	.....	.....	.....	.....	151
Total employees.....	.....	1 3,434	.....	5,652	.....	369	.....	.....	74	.....	1 9,529
Total persons....	3,572	.....	6,438	.....	2,406	.....	2,536	2,736	.....	3,962	21,650

¹ Includes 63 American civilian employees of the United States Army and Navy.

WORKING FORCE.

The working force varied between 20,375 and 22,529 during the year. Table No. 1 shows the number actually at work at the close of the year, the date of enumeration being June 23, 1920. Table No. 2 shows the variation from month to month. Table No. 3 gives a comparison with previous years.

While the force changed but little in numbers, the turnover of personnel was, as usual, great. No figures are available for the labor force of West Indians (known as silver roll force); but it is known that emigration to Cuba and the United States increased greatly. Immigration was also active, and there was available at all times on the Isthmus a larger labor force than the Canal and railroad could absorb. Wages paid by the Canal are somewhat higher, and living costs are generally lower on the Isthmus than in the industrial centers of the West Indies and the Caribbean coast.

The turnover in force of Americans, represented by new employments and separations from the service, was approximately 30 per cent, due to American employees having resigned to return to the United States. In general, however, the cost of living on the Canal Zone is less than in the United States, due to such perquisites as free quarters, medical care, and vacation with pay, which form part of the contract necessary to attract American men to this service.

TABLE NO. 1.—*Force actually at work on June 23, 1920.*

	Monthly.	Silver employees' wages specified in United States currency.									
		Artisans.					Laborers.				
		Special.	31 cents.	29 cents.	26 cents.	24 cents.	27 cents.	25 cents.	24 cents.	23 cents.	21 cents.
Operation and maintenance:											
Office.....	42	1									
Building division.....	99	1	15	283	315	333				323	179
Electrical division.....	73		2	15	17	105				52	24
Municipal engineering division.....	300		44	69	80	95		1		140	421
Lock operation.....	503			4	6	11				18	50
Dredging division.....	843			20	28	33		1		117	77
Mechanical division.....	135	13	31	55	219	457				569	234
Marine division.....	431	58									
Fortifications.....	50	3	26	31	29	24				37	73
Total.....	2,476	76	118	477	694	1,058	2			1,256	1,058
Supply department:											
Quartermaster.....	848		52	103	71	115			2		615
Subsistence.....	388			2		1					
Commissary.....	1,104	1	2	18	16	15		7	12	5	67
Cattle industry—plantations.....	263	483		5	6	7					39
Hotel Washington.....	100			1	2						
Accounting department.....	10										
Health department.....	464	29	3	6	5	7				19	300
Executive department.....	238			3	2	2					3
Panama Railroad:											
Superintendent.....	133		4	24	8	28	6	1		5	355
Transportation.....	182										
Receiving and forwarding agent.....	126	99	49		73		486	1,114			
Coaling stations.....	387	15	52	21	20	23	641				4
Total.....	4,243	627	162	183	203	198	647	494	1,128	5	1,383
Grand total.....	6,719	703	280	660	897	1,256	647	496	1,128	5	1,365

TABLE NO. 1.—*Force actually at work on June 23, 1920—Continued.*

	Silver employees' wages specified in United States currency.									Total.		Grand total.
	Laborers.									Silver.	Gold.	
	19 cents.	17 cents.	16 cents.	15 cents.	14 cents.	13 cents.	12 cents.	11 cents.	Task.			
Operation and maintenance:												
Office.....										43	39	82
Building division.....						2		3	1	1,554	519	2,073
Electrical division.....										288	248	536
Municipal engineering division.....						6		13		1,169	113	1,282
Lock operation.....										592	169	761
Dredging division.....								1		1,120	191	1,311
Mechanical division.....						2		5		1,720	988	2,708
Marine division.....										489	181	670
Fortifications.....	4									277	55	332
Total.....	4					10		22	1	7,252	2,503	9,755
Supply department:												
Quartermaster.....						1		5	2	1,894	216	2,110
Subsistence.....										391	36	427
Commissary.....	4	4	22	53	99	15	72	69	15	1,605	313	1,918
Cattle industry plantations.....										803	28	831
Hotel Washington.....										103	10	113
Accounting department.....										10	250	260
Health department.....					2	2				837	245	1,082
Executive department.....										248	567	815
Panama Railroad:												
Superintendent.....						6		8		578	74	652
Transportation.....										182	148	330
Receiving and forwarding agent.....										1,947	98	2,045
Coaling stations.....						10				1,173	120	1,293
Total.....	4	4	22	53	101	34	72	82	17	9,771	2,105	11,876
Grand total.....	8	4	22	53	101	44	72	104	18	17,023	4,608	21,631

TABLE NO. 2.—*Force reports, by months, fiscal year 1919–20.*

Year and month.	The Panama Canal.		Panama R. R. Co.		Grand total.
	Gold.	Silver.	Gold.	Silver.	
1919.					
July.....	3,076	14,729	362	3,209	21,376
August.....	3,560	14,645	396	3,497	22,098
September.....	3,639	14,590	392	3,646	22,267
October.....	3,697	14,080	351	2,247	20,375
November.....	3,704	13,501	343	3,032	20,580
December.....	3,707	14,405	360	3,586	22,058
1920.					
January.....	3,753	14,697	375	3,573	22,398
February.....	3,863	14,593	381	3,041	21,878
March.....	4,105	13,288	425	3,892	21,710
April.....	4,189	13,871	448	4,021	22,529
May.....	4,196	13,630	435	3,472	21,733
June.....	4,165	13,272	437	3,709	21,583

TABLE No. 3.—*High and low force records, December, 1906, to June 30, 1920, by fiscal years.*

	The Panama Canal.			Panama R. R., gold and silver.	Total Panama Canal and Panama R. R.
	Gold.	Silver.	Total.		
1906.					
December.....	3, 881	15, 604	19, 485	4, 416	23, 901
1907.					
October.....	4, 992	20, 836	25, 828	6, 139	31, 967
January.....	4, 033	16, 987	21, 020	4, 796	25, 816
1908.					
April.....	4, 950	21, 168	26, 118	7, 052	33, 170
November.....	4, 161	19, 803	23, 964	5, 863	29, 827
1909.					
October.....	4, 376	23, 411	27, 787	7, 618	35, 495
January.....	4, 295	20, 583	24, 878	6, 393	31, 271
1910.					
March.....	4, 553	26, 284	30, 837	7, 829	38, 676
December.....	4, 705	24, 383	29, 098	6, 044	35, 142
1911.					
December.....	4, 420	25, 439	29, 859	7, 967	37, 826
June.....	4, 292	21, 795	26, 087	6, 603	32, 690
1912.					
January.....	4, 332	25, 818	30, 150	8, 024	38, 174
August.....	4, 122	24, 860	28, 982	5, 855	34, 837
1913.					
August.....	4, 087	30, 918	35, 005	4, 957	39, 962
December.....	3, 744	23, 209	26, 953	5, 195	32, 148
1914.					
January.....	3, 944	23, 824	27, 768	5, 502	33, 270
June.....	3, 790	21, 499	25, 289	4, 343	29, 632
1915.					
July.....	4, 198	22, 846	27, 044	5, 314	32, 358
February.....	3, 088	17, 023	20, 111	2, 978	23, 089
1916.					
July.....	3, 208	17, 982	21, 190	5, 349	26, 539
September.....	3, 129	17, 160	20, 289	2, 447	22, 736
1917.					
January.....	3, 552	17, 989	21, 541	4, 453	25, 994
June.....	3, 229	16, 381	19, 610	3, 368	22, 978
1918.					
July.....	3, 186	17, 152	21, 338	4, 645	24, 983
June.....	2, 763	12, 798	15, 561	3, 067	18, 628
1919.					
February.....	3, 032	14, 660	17, 692	4, 200	21, 892
September.....	2, 639	12, 812	15, 451	3, 056	18, 507
1920.					
April.....	4, 189	13, 871	18, 060	4, 469	22, 529
October.....	3, 697	14, 080	17, 777	2, 598	20, 375

NOTE.—Figures do not include contractor's forces. If taken into consideration, the greatest working force ever reported was 44,733 on Mar. 26, 1913.

LIVING COSTS.

Various studies were made during the year to determine how great had been the advance in the cost of living since 1914. The most exhaustive of these applied expressly to the West Indian, or labor force, but as an index of price changes this holds good, also,

for the whole community. It was found that the percentage increase in four groups from July 1, 1914, to July 1, 1920, was as follows:

Food.....	101.11	Household.....	105.30
Clothing.....	71.59	Personal.....	65.47

Weights assigned to these percentages indicated a gross increase of 87.39 per cent in the case of West Indian employees; and this would not vary greatly for American employees on the basis of "necessities" only.

COMPLAINTS OF AMERICAN EMPLOYEES.

As a result of a number of conferences with committees of the organized American employees, it was decided before the close of the year to constitute a grievance board to advise the Governor on complaints of American employees. Although the decision was made during the fiscal year 1920, it was not actually put in force until July 13, 1920, when the Governor made the following announcement:

1. A board is hereby appointed to make investigations and appropriate recommendations to the Governor in the matter of such complaints of employees concerning working conditions as may be from time to time referred to it. The board will be composed of the engineer of maintenance, two employees as representatives of organized labor, viz., Messrs. W. C. Hushing and Harvey McConaughy, and, in each case, the head of the department or division in whose jurisdiction the complaint originates.

2. The functions of the board are wholly advisory, and its findings and recommendations will not be effective until approved by the Governor.

3. Complaints against administrative policies of the Canal and Panama Railroad will not, in general, be referred to the board; but the Governor may require the board to make recommendations to him on any matter involving the general welfare of employees.

4. The following procedure will be followed preliminary to the reference of complaints to the board: An individual employee or a group of employees belonging to a labor organization affiliated with the American Federation of Labor will present the complaint to the proper local union or shop committee, who will endeavor to adjust the matter with the immediate superiors of the employee or employees concerned, including division or department heads. Unless adjusted, this complaint will then be submitted to the Panama Metal Trades Council or Central Labor Union, as the case may require, in complete form, and if the proper officers or committees of these bodies can not arrange satisfactory settlement, the case will be forwarded by them to the Governor, with request for reference to the board. Cases which from their nature require immediate action may be submitted to the Governor by the President and Secretary of the Metal Trades Council or Central Labor Union, with the facts and reasons clearly stated. The complaint may then be referred to the board by the Governor, if practicable.

5. The board is authorized to formulate its methods of procedure.

6. It will be noted that the board is to act on the complaints of members of labor organizations affiliated with the American Federation of Labor only. The right of all employees, individually or collectively, whether members of a labor organization or not, to make complaint to the Governor, will be continued.

7. The bureau of statistics will keep a record of all meetings and proceedings of the board.

8. Additional instructions will be issued from time to time as may be necessary.

COMPENSATION OF AMERICAN EMPLOYEES.

The wages of American employees are fixed with relation to those of similar classes of workers in the United States; and each of the many changes experienced there has been reflected here in some degree. In the United States the problems of employment affect

many more people than here; but they are spread over larger territory and are handled by many agencies. In the Canal Zone the Government is the only employer. Its employment problems embrace the features of government, transportation, manufacture, and distribution. It must deal with all of these in such a way as to maintain a proper relationship between industrial conditions of the Canal and the United States, and also among the various classes or units of the Canal organization. The problem of coordination between like classes of workers here and in the United States is complex according as conditions of employment vary in the States and on the Isthmus; but the additional problem of maintaining a proper balance among the various unrelated classes in the Canal organization is always complicated and difficult. For instance, what relation should there be in the compensation of machinists, doctors, clerks, and bakers?

Heads of departments and divisions find such problems as these occupying a large amount of time. To assist in a proper administrative handling of questions bearing on the compensation of clerks, and related classes, the Governor has referred such cases to a committee composed of the executive secretary, the auditor, and the chief quartermaster. This committee has acted on scores of cases, and it is believed has succeeded in keeping a proper balance in the rates of pay of employees in administrative work. Such matters as can not be settled by heads of departments and divisions, or by committees of these officials, have been referred to the wage board.

The wage board continued to function in accordance with the rules laid down in the circular letter of March 31, 1919, which was quoted in full in my annual report for 1919. The work of the board is referred to here because the statistical and clerical service necessary for its functioning have been rendered by this department. The equivalent of the time of two employees has been devoted exclusively to this work. The board has been composed of the engineer of maintenance, Col. Jay J. Morrow, representing the administration, and Mr. W. C. Hushing, chosen by the central body of the various labor organizations, to represent the employees. Of the many cases considered, the following few are instanced, as revealing the variety of classes affected; and the character of determination reached by the board or by the Governor after the board had made reports to him.

Building trades.—Rates paid on "cost-plus" contracts under the construction division of the Army in the United States were used as bases for adjustment of rates of bricklayers, carpenters, painters, plasterers, plumbers, metal lathers, and tile setters in the Canal service most of whom were employed in the construction of concrete buildings at the new Army posts at Miraflores and Gatun. On account of the constant advance of these rates in the United States, an adjustment was made every two months on the Isthmus, beginning August 1, 1919.

Metal and shop trades.—On June 8, 1920, the Navy Department announced that the compensation of employees in the navy yards would be increased July 1, 1920, by \$240 a year, the so-called "bonus." The pay of all Americans on the Isthmus doing work similar to that of navy yards, and of employees drawn from the shops trades is based on rates paid in the navy yards. An adjustment of the rates of these employees, numbering fully one-third of the force, was in progress at the close of the fiscal year. Fifty distinct occupations or crafts are affected by this one adjustment.

Municipal engineering foreman.—These rates were adjusted on the basis of a differential of 5 and 10 cents less an hour than the average of rates for foremen of carpenters, masons, and plumbers, and lead-ingmen of pipe fitters and ironworkers; all of which classes of work are supervised to some extent by these foremen.

Chauffeurs.—An adjustment was made on the basis of an average of rates paid by the American Railway Express Co., Post Office Department, Motor Transport Corps, and Rock Island Arsenal, because the work on the Canal Zone includes some of each of these classes.

Bakery foremen.—These rates were adjusted with relation to rates in 26 bakeries in the United States in 19 cities and 14 different States, from which comparable data were received, consideration being given to conditions of employment as well as rates.

Pilots.—The rates for this class were based on pay of pilots at Cape Cod Canal while that waterway was being operated by the Govern-ment.

Railroad positions.—The decisions regarding wages of employees on the railroads of the United States are necessarily complex, because the service is complex. To apply these rates to conditions on the Isthmus adds other complications. Yet this must be done. The rates for transportation and car-shop employees are determined on this basis. During the year the schedules for hostlers and car-shop employees were adjusted on the basis of changes in the United States. At the close of the year an announcement of a further, and general, adjustment in the United States, effective May 1, 1920, was made and this will be the basis for further adjustment on the Isthmus.

Construction and engineering foremen.—This term covers a large class on the Isthmus, including foremen who are not actually engaged in construction work but are coordinated with this class. The scale of rates was determined with reference to wages paid by the Engineer Department, United States Army; the Reclamation Service; Light-house Service; and the District of Columbia.

Stevedore foremen.—The rates for this class were made with relation to the rates fixed by the National Adjustment Commission for long-shore service at North Atlantic ports, due regard being paid to proper coordination on the Isthmus. A readjustment following changes in the United States was in progress at the close of the year.

Other cases.—Among other cases considered were the following:

References of cases appealed to the Secretary of War and sent by his request to the wage board, plumbers, carpenters, heavy forgers.

Application of bonus of \$240 to certain administrative positions and proper coordination of such positions with similar ones in the United States.

New rates for nurses on account of 20 per cent increase in the rates for Army nurses.

Apprentices of mechanical trades, blacksmiths, bureau chiefs, butchers, cement finishers, chauffeurs, chemists, clerks of various classes, cold storage plant employees, cost accountant, cremator and embalmer, customs inspector, dispensary assistant, dredgemen, electricians, entomologist, filter operator, fire truck operator, floating crane officers, foremen of various classes, inspector of hulls and boilers, inspector of motor cars, instructor of apprentices, laundrymen, mill-men, marine draftsmen, marine officers, patternmakers, pharmacists,

physicians and surgeons, planners, pontoon bridge operators, postoffice positions, poultry experts, pumpman, quarantine custodians and inspectors, restaurant managers, sanitation inspectors, school teachers, station engineers, superintendent of leper asylum, technician, telephone inspector, weighmaster.

COMPENSATION OF WEST INDIAN EMPLOYEES.

In continuance of the policy of adjusting the wages of West Indian employees at such times as changes in the cost of living seem to justify this course, two increases were made during the fiscal year, and a third was authorized, effective July 1, 1920. In these adjustments the rates effective in 1914 are taken as the base, and the minimum rates and earnings are given primary consideration, since it is on the lowest paid classes of workers that the burdens of increases in living costs are heaviest. The following statement shows the general trend of wages for the common labor class since 1914:

Common laborers' rates.

	Cents an hour.
May 1, 1914.....	10
Jan. 1, 1917.....	12
Oct. 1, 1917.....	13 and 14
May 1, 1918.....	15
Nov. 1, 1918.....	17
July 1, 1919.....	19
Feb. 1, 1920.....	21
July 1, 1920 (new fiscal year).....	23

In 1914 the men worked 9 hours a day and their earnings were therefore, 90 cents: since that time all of the force has been placed on the eight-hour basis, so that in determining the present rates the daily earnings are compared rather than the hourly.

In December, 1919, a committee representing an organization of the West Indian employees called on the Governor and stated that the wages paid at that time were not sufficient to maintain the employees at that standard of reasonable decency and comfort which he had recognized as incumbent upon the Government and the Panama Railroad Company to insure. The Governor referred the matter to a board composed of the heads of departments and divisions, which has acted on such questions for years past. Meanwhile he directed that a special inquiry be made by the labor inspector, and that data of living costs be brought up to January 1, 1920.

The board met on January 2, 1920, and considered the report of the labor inspector and such data as were available on living costs. On January 9, the board heard a committee of West Indian employees and stenographic notes were taken of the salient parts of the testimony. The committee was asked to submit data in support of the claims made by it, and also was asked to meet with the chief quartermaster to discuss features of a lease for land and quarters at Las Cascadas, where The Panama Canal is endeavoring to establish an agricultural colony of West Indians to be used as a reservoir to supply laborers for intermittent or casual work. No data were submitted, the committee stating that those in the hands of the Canal authorities were sufficient. The committee did not avail itself of the opportunity to meet with the chief quartermaster to discuss the terms of the leases.

On the basis of the information in its possession the board recommended to the Governor on January 24, and the Governor approved, the following advances: Hourly rates, 2 cents; monthly rates, \$5; per diem, 15 cents.

The Governor also directed the board to meet thenceforth on the 15th of the last month of each quarter for the purpose of determining whether changes in living costs during that quarter were such as to indicate changes (either advances or reductions) in rates of pay. The board, in turn, directed that a method of figuring living costs and changes therein be adopted on the basis of actual purchases by West Indian employees at the commissaries for a period of three months. Such a study was made and the results of this form the basis on which rates are now determined. It is pertinent that the new and more elaborate studies confirm the conclusions formerly reached, when a few leading articles of food and clothing were used as indices of changes in prices.

On the basis of changes in living costs no adjustment was found necessary as of April 1; but an adjustment for July 1 was recommended by the board at its meeting in June. This adjustment is an advance of 2 cents on hourly rates, \$2.50 on monthly rates, and 10 cents on per diem rates.

STRIKE OF WEST INDIAN EMPLOYEES.

At the time it was found that an increase of 2 cents an hour in rates of pay should be given on February 1, 1920, the organization of West Indian employees had demanded an increase of 7 cents an hour, and certain other changes in conditions of employment. The refusal to grant these demands was met with a strike on February 24, when approximately 15,000 to 17,000 quit work.

The employees had been incited to this action by some white men from the United States who organized them, took their money, and then deserted them. Such men know nothing about conditions in the Tropics, are not familiar with standards of living in the countries bordering the Caribbean, and entirely ignore the fact that wages are higher at The Panama Canal and prices of necessities lower than in any of the cities of the Caribbean coast and islands. There are two distinct classes of workers in the Canal force—American citizens, who live according to the standards of their home communities, and West Indian negroes, whose standards of living, although higher, are fairly comparable with those of their home communities. The wages of each class are representative of a liberal allowance for maintaining its accustomed standards.

Realizing that the mass of these men had been misled and misinformed, the Governor announced that all who were not back at work on February 26 would be considered as having voluntarily left the service without due notice. Rules of long standing provide that in such cases reemployment may be only at a lower rate of pay than that received at the time of quitting. Meanwhile steps were taken to clear the Canal quarters of persons not employed, and to fill the places of the men who had quit work. On March 2 the strike leaders officially advised the men to return to work; and a few days later the force was at its normal strength.

Except for about 2,000 West Indians and native laborers who remained loyal to the work, the strike of silver-roll employees was complete. Thanks to the readiness of the American employees to turn to whatever work was given them to do, it was possible to keep the Canal in operation, to feed and provide the force with water and light.

Shortly after the strike a request was made to the British Government by some of the West Indian employees for an investigation. Such an investigation was conducted with the full consent of the United States Government. The Panama Canal placed at the disposal of the special agent of the British Government all of the facts in its possession, and in every way facilitated the inquiry. The report had not been made public at the close of the fiscal year.

EMPLOYEES AND THE LAND.

The concentration of Canal work at the two termini, the difficulty of moving large numbers of men by railroad each morning and evening from interior points to the termini, and the policy of depopulating the Canal Zone based upon sanitary and military considerations, have resulted in taking the West Indians from the small farm and hamlet conditions which existed during the construction of the Canal and crowding them into the cities of Panama and Colon. This condition was called to the attention of the Congress in 1917 with a request for funds to construct quarters for the employees in the Canal Zone; but so far no appropriation has been made for this purpose. The result is that between ten and fifteen thousand men and their families, accustomed to country life and to raising a part at least of their food, are unable to assist themselves by gardening, and at the same time feel forced to adopt the city standards of dress and entertainment. The board on rates of pay for silver employees recommended to the Governor that steps be taken to encourage gardening on the part of those employees who live near unfenced lands in the Canal Zone; and this has been done. In addition, the project for establishing a reservoir of laborers at Las Cascades in the old buildings of the depopulated village, and allotting to the tenants plots of land adjacent for gardens, has been worked out. So far, however, the West Indians seem reluctant to avail themselves of the opportunity offered.

PUBLICITY.

During the year more effort has been devoted to advertising the Canal and the facilities at its termini for meeting the needs of ships. Authority was secured from the Secretary of War to expend not more than \$75,000 in the placing of advertisements in representative shipping and commercial papers in Europe and Japan. Action was deferred, by direction of the Governor, on account of the coal shortage, but beginning in November a quarter-page advertisement has been placed in the London Times Trade Supplement and 6-inch advertisements (3 inches deep by 2 columns wide) in each of the following: Lloyd's List, and Fairplay in England; Courant, Holland; Lloyd Anversois, Belgium; Lloyd Francais, France; Mercantile and Ship Gazette, Norway; Diario del Comercio, Spain; and Børsen, Denmark, at a total annual cost of \$18,990.61. The form

of the advertisements is being changed approximately once a month; a series of advertisements is now running, featuring, successively, the various facilities for shipping.

Material has been furnished to shipping magazines, commercial papers, and the general press for articles on features of the Canal and the traffic through it and at its termini. Most of this has been in the form of completed articles, with photographic illustrations, though in other cases material has been furnished for the compilation of articles either in response to requests or voluntarily offered to magazines. Cable dispatches to news-gathering organizations on events of particular interest have been sent regularly.

A folder containing concise descriptive, statistical, and historical information about the Canal, with a relief map, was published in an edition of 10,000 for general distribution. A folder devoted to the Canal in its relation to the foreign trade of the United States was published in an edition of 5,000 for distribution at the Seventh Annual Foreign Trade Convention. Preparation of a new Official Handbook was completed and it will be published on the arrival of the photoengravings from the United States. A folder entitled "Panama, a Place to Visit," has been published in an edition of 5,000, under the direction of the tourist committee, and given general distribution, principally through travel bureaus.

The tourist committee was established primarily as a means of publicity, with the idea of availing of the word-of-mouth commendations which are given and the articles written by those who have visited the Canal. Its purpose is to encourage visitors and to see that they are cared for comfortably while on the Isthmus and given facilities for seeing the Canal and its appurtenances. Its personnel consists of the master of transportation of the Panama Railroad, the manager of the Washington Hotel, the manager and assistant manager of the Tivoli Hotel, and the publicity man of the Canal. The committee has engaged actively in its task and is securing good results.

Direct mail advertising forms a considerable part of the publicity. The Panama Canal Record, the Sailing Directions, the Tariffs, and all circulars and notices affecting marine interests are mailed to shipping interests all over the world, through this and the Washington office, and especial attention is paid in this office to furnishing information to the managing offices of newly established companies which may make use of the Canal. The answering of all but routine inquiries about shipping and traffic is handled as a part of the publicity service.

The Panama Canal Record has been continued as the weekly official bulletin of The Panama Canal and the Panama Railroad, publishing all of the circulars with general bearing issued by both, the monthly reports of the Governor, and a variety of news and statistical articles bearing on the operation of the Canal and its adjuncts. Free distribution is made to steamship and commercial interests, public libraries, the employees of the Canal and railroad on the gold roll, consular officials all over the world, and other governmental interests on the Isthmus and in the United States. Distribution on and from the Isthmus has been about 5,500 copies a week; distribution through the Washington office, about 2,400 copies, with 100 extra copies of numbers containing special articles for which there

is likely to be demand; and 350 copies are reserved for binding in the permanent volumes. The subscription rate to private interests has been continued at \$1 a year for those reached under domestic postal rates, and \$1.50 for those for whom foreign postage is paid. Receipts from subscriptions and sales during the fiscal year amounted to \$205.18.

ORGANIZATION OF EXECUTIVE DEPARTMENT.

The organization of the department has remained unchanged during the year, although there have been many changes in personnel. The gold roll force compared with the two previous years was:

	June 30, 1918.	June 30, 1919.	June 30, 1920.
General.....	19	20	21
Record bureau.....	24	24	23
Personal bureau.....	12	12	12
Bureau of pay rolls.....	42	46	46
Correspondence bureau.....	22	23	22
Property and requisition bureau.....	15	18	16
Bureau of statistics.....	5	7	6
Bureau of clubs and playgrounds.....	25	31	67
Total.....	164	181	213
Division of civil affairs.....	113	96	81
Division of police and fire.....	174	174	182
Division of schools.....	65	72	78
Office of special attorney.....	5	5	5
Courts.....	14	14	14
Joint commission.....	4	5	.....
Total.....	539	547	573

THE EXECUTIVE OFFICE.

The work of the executive office was continued under direction the chief clerk, Mr. J. H. Smith, with a total gold roll as shown above. A summary of the work done by the various bureaus follows:

BUREAU OF CLUBS AND PLAYGROUNDS.

Clubhouses were operated for gold employees at Balboa, Ancon, Pedro Miguel, Gatun, and Cristobal; also a boat house at Fort Amador. Clubhouses for silver employees were operated at La Boca, Red Tank, Paraiso, Gatun, and Cristobal. Playgrounds were operated at Balboa, Ancon, Pedro Miguel, Gatun, Cristobal, and Colon Beach for the children of gold employees.

During the year changes were made on the buildings at Balboa and Cristobal. The reading room at the Balboa clubhouse was enlarged, the side walls of the building removed, book cases installed in the library, a librarian put in charge of the reading room and library. With the completion of these changes, the main floor of the Balboa clubhouse has been made considerably more attractive and useful.

The main floor of the Cristobal clubhouse has been enlarged, the side walls of the building removed, the billiards and bowling located close together. The entertainment hall on the second floor has been removed from one end of the building to the other, making the enter-

tainment hall more comfortable on account of the prevailing breezes being from this end of the building.

New equipment has been received in the various gold clubhouses, consisting of phonographs, furniture, and billiard tables.

Two bowling alleys are being removed from the silver club at Paraiso, where they are little used, to the gold clubhouse at Pedro Miguel, where there has been a great demand on the part of the bowlers for two additional alleys.

Local entertainments were given as usual, and, in addition, entertainers have come down from the States about once in two months. Moving pictures are exhibited in all clubhouses; song services on Sunday nights at Ancon, Gatun, and Paraiso; study clubs at La Boca.

A boys' work director was added to the personnel, and has the work well in hand at Balboa.

The Y. W. C. A. is handling the girls' clubs in Balboa and Cristobal, assisted by this bureau.

Following is the report of the director of physical education and play.

GRAMMAR SCHOOL PHYSICAL EDUCATION.

(a) *Classroom work.*—A change in the character of the program of physical work conducted in the five white Canal Zone grammar schools by the bureau of clubs and playgrounds, for the division of schools, was instituted at the beginning of the 1919 school year, last October, to take the place of the 25-minute supervised recess held on the school playgrounds the previous year. The new program provides for lessons in marching, graded mass calisthenics, rhythmic steps, in the school room 10 minutes each day, or, when the weather permitted, on the lawns near the school buildings. The new lessons were demonstrated to each class by the physical director of the local clubhouse once every two weeks, and reviewed daily by the classroom teacher. At the close of the school year over 200 children took part in a special school program on the lawn in front of the Balboa school building. This program consisted of a flag drill, circle games, pyramid work, apparatus work, tumbling, and push ball.

(b) *Gymnastic exercises.*—Gymnastic classes for grammar school boys were held in the clubhouses, and consisted of setting up exercises, apparatus work, and games.

(c) *Tennis.*—The upper grade boys and girls were permitted to use the tennis courts, under supervision, several afternoons each week. All balls and rackets were furnished by the bureau.

(d) *Athletics.*—The annual inter-class track and field meet for boys and girls held on the Balboa athletic field, May 29, 1920, was a great success, the seventh grade competing against the eighth, the fifth against the sixth, the third against the fourth and the first against the second.

(e) *Baseball.*—A four-team baseball league for older boys was organized and a series of games played on Saturdays and holidays during the months of January, February, and March, and a playground league for boys of 90 pounds and under was organized, and games played off on Wednesdays and Fridays, after school, during the same period.

HIGH-SCHOOL PHYSICAL EDUCATION.

(a) *Physical training.*—Classes for high-school students were held in the clubhouse gymnasium after school, from 3.20 to 4.20, two periods a week. The program for boys consisted of marching, calisthenics, apparatus work, wrestling, and team games. The program for girls consisted of formal gymnastic apparatus work, gymnastic and esthetic dancing, and team games, special emphasis being placed in posture. An examination on posture was held at the close of the school year, and each girl was required to illustrate her ideas of good and bad posture, by means of a chart. Some very clever work was done, and the best charts were placed on exhibition in the Balboa high-school auditorium.

(b) *Tennis.*—The students of the high schools were given an opportunity to learn how to play tennis, free of charge, on courts operated by this bureau. Several weeks were spent in teaching the rudiments of the game, and as soon as the beginners were able to handle the rackets an inter-class tournament was held, consisting of singles of boys and girls, doubles, and mixed doubles.

(c) *Baseball*.—Teams were organized in both the high schools, but were handicapped as usual by lack of opportunity for competition. A few games were played with teams composed of boys employed in the shops, older grammar-school boys' teams, teams composed of men from the Army and Navy stationed on the Zone, and an occasional game with crews from visiting ships. A large number of Balboa and Cristobal high-school boys played on teams in the Sunset and Twilight leagues.

(d) *Athletics*.—The annual inter-class track and field meet for boys and girls was held on the Balboa athletic field, April 10, 1920, and a dual track meet between the two high schools on June 10, 1920.

(e) *Swimming*.—Swimming is one of the most important branches of physical education, and classes were held in the Balboa pool twice a week throughout the season for grammar-school and high-school boys and girls, under the personal supervision of the swimming instructor. All members of the senior class of the Balboa High School were required to pass a rigid test before graduation, consisting of swimming, life-saving, and resuscitation.

In addition to the regular free swimming classes conducted for school children, the Balboa swimming pool continues to attract a steady stream of paid patronage from the Balboa, Ancon, and Corozal districts, and is increased from time to time by crews from visiting ships in transit through the Canal. Every effort is made to make the work interesting. An exhibition was staged for the benefit of approximately 1,000 officers and men from a Japanese war vessel. Exhibitions of water polo games, diving, and swimming were arranged between the local high school and visiting crews of United States and British naval vessels. By special arrangement with the bureau of clubs and playgrounds, the Army and Navy Y. M. C. A. has furnished free swims, averaging approximately 800 per month, to United States service men stationed on the Zone, and crews of English and American war vessels in transit through the Canal. Gen. Pershing presented the Grieser silver trophy cup to a group of children who had qualified in swimming, diving, and life-saving.

In view of the large participation in this more or less hazardous exercise, it is pleasing to note that there were no serious accidents in the Balboa pool during the year.

Bowling.—Grammar-school and high-school boys and girls were permitted to use the clubhouse bowling alleys, free of charge, before 4 p. m. daily, and Saturday mornings, under supervision. Local mixed duck pin leagues were rolled off after 6 p. m., for men and women in the various communities, under the direction of the bowling alley manager, and a Pacific duck pin league, consisting of four teams, bowled a series of games during February and March. The alleys in the terminal clubhouses are always in great demand by crews from visiting ships.

PLAYGROUNDS.

New playsheds were added to the equipment at Pedro Miguel and Gatun, and one shed was erected near the Folks River Beach in New Cristobal, for the children living in that community. These sheds are approximately 42 by 80 feet, enclosed with chicken wire. Dirt floors have proven to be very unsatisfactory, and experiments were made with floors of asphalt and concrete, at Balboa and Pedro Miguel, and it was found that a steel float finished floor would be satisfactory for all purposes in this climate. We propose to install these in all of our sheds, as soon as funds are available.

Sand shelters and wading pools were also added to the equipment at Pedro Miguel and Gatun. These additions are very popular with the younger children, and we propose to build one of each on the playgrounds at Ancon and New Cristobal.

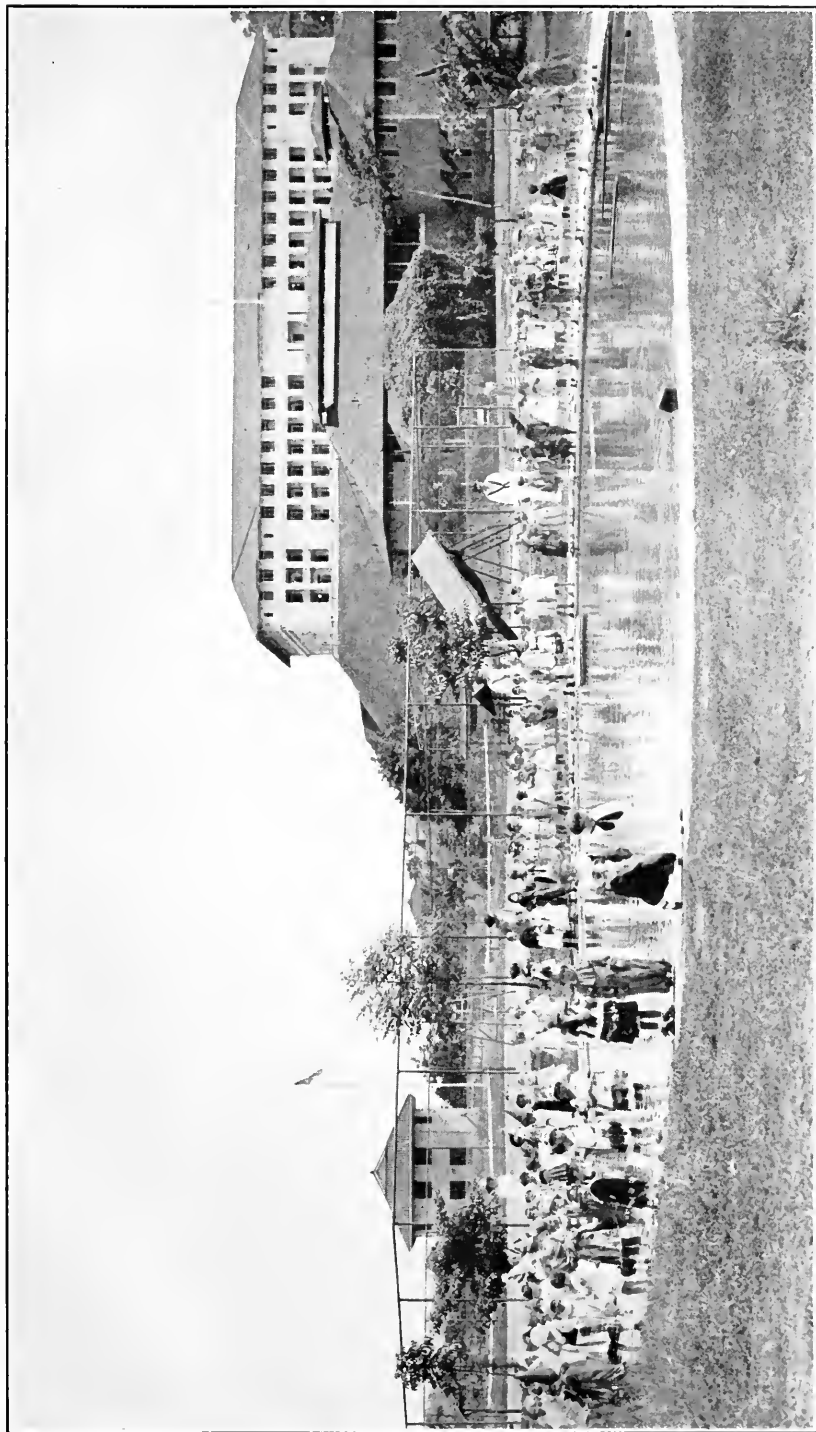
The communities of Pedro Miguel and Gatun celebrated the opening of their new playsheds with appropriate exercises. Several hundred people were in attendance at each place.

The playground programs were as follows:

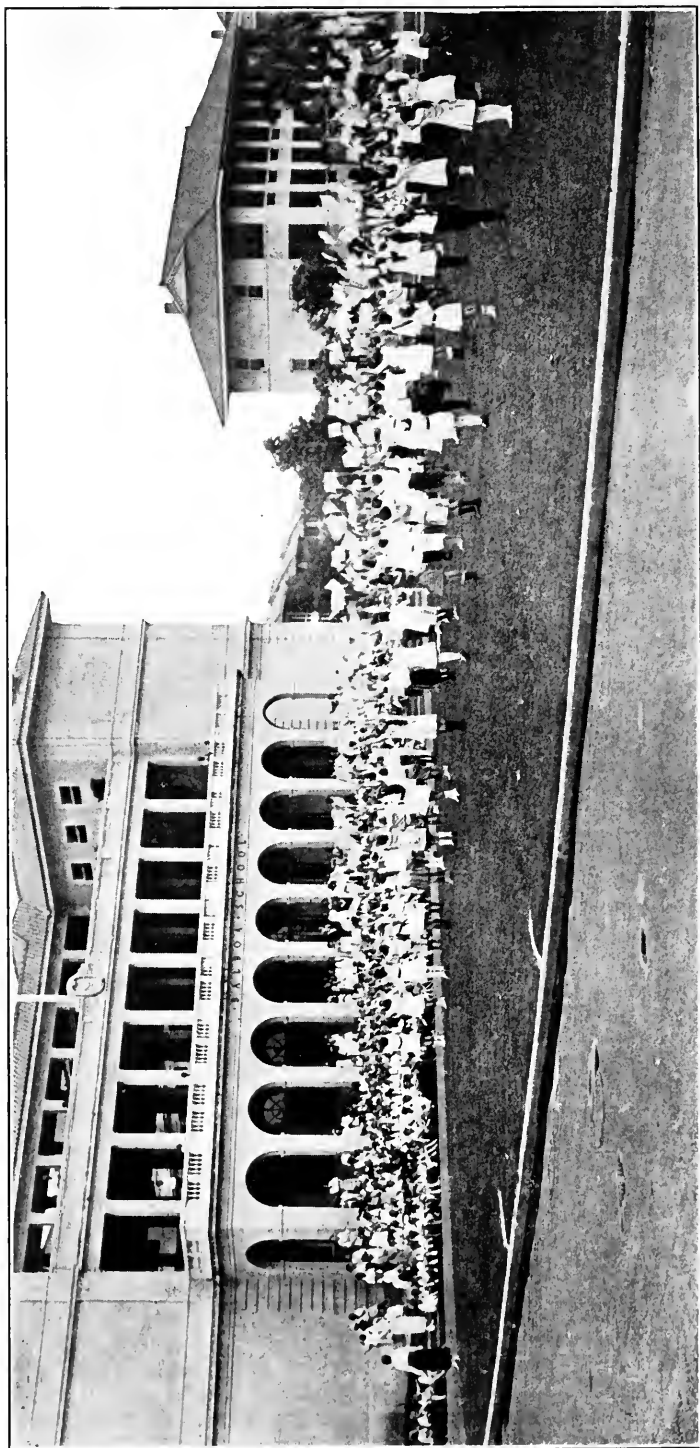
1. Children 3 to 6 years of age were in attendance from 9 to 10.30 a. m. daily, and were taught singing, games, dances, action plays, paper folding, and crayola work, and a half hour or more was devoted to story telling and free play. Special community parties were held from time to time, in which the children took an active part in the programs, and assisted in preparing for and entertaining parents and visitors.

2. Grammar school children from 6 to 12 years of age were assigned two to three periods a week, from 3 to 4 p. m. Instructions were given in dramatic action plays, gymnastic drills, ball games, and free play.

3. Grammar school boys and girls over 12 years of age, were given two or three periods per week, on the playground, and in the clubhouse in inclement weather. The program for this group consisted of gymnastic drills, apparatus work, group and team games.



BALBOA, CANAL ZONE. PLAYGROUNDS FOR CHILDREN. HALLOWE'E'N PARTY. OCTOBER, 1919.



BALBOA, CANAL ZONE, SCHOOL. FLAG DRILL. CLOSING EXERCISES. JUNE 25, 1920.

SUMMARY OF ATTENDANCE ON PLAYGROUNDS NOT INCLUDED IN CLUBHOUSE ACTIVITIES.

Playgrounds supervised, approximately, 312 days per year.

Average daily attendance of children 3 to 6 years of age, on 5 playgrounds.....	164
Average daily attendance of children 6 years and over, on 5 playgrounds.....	552
Total average daily attendance all groups, on 5 playgrounds.....	717

TOTAL ATTENDANCE.

Balboa:	
Younger children.....	25, 507
Older children.....	41, 391
Ancon:	
Younger children.....	9, 357
Older children.....	101, 673
Pedro Miguel:	
Younger children.....	2, 754
Older children.....	2, 534
Gatun:	
Younger.....	5, 243
Older children.....	7, 779
Cristobal:	
Younger.....	8, 553
Older children.....	118, 993
Total for year.....	223, 784

OUTINGS, CAMPS, EXHIBITIONS, ETC.

Two separate boys' camps of from ten to fifteen days each were conducted under supervision of the bureau at Boquette, in the Province of Chiriqui, Republic of Panama, and one girls' camp, in cooperation with the Y. W. C. A., at Taboga Island, Republic of Panama, last year. All-day hikes, and one-day camps were conducted on Saturdays and holidays throughout the dry season. Children's entertainments were promoted on the playgrounds Hallowe'en; Decoration Day was observed on all playgrounds by appropriate, patriotic children's exercises. A community Christmas pageant, with over 165 children and 50 adults participating, was directed and staged on the lawn in front of the administration building Christmas Night by employees of the bureau.

RECORD BUREAU.

The work of the record bureau was carried on with a force of 23 gold and 28 silver employees.

In addition to maintaining the current files and the permanent records of The Panama Canal and Panama Railroad, the bureau has charge of the accumulation and classification of records turned in by field offices; the publication of all rules and regulations, rates, circulars, etc.; the custody of documents and publications; the custody of timekeeping records; the indexing and recording of engineering records, including maps, drawings, and photographs; the receipt, distribution, and dispatch of correspondence and mail matter for all offices in the administration building other than the accounting department; the furnishing of messenger service for entire administration building; the operation of the Canal Zone library system.

The library has five branches in the five Panama Canal clubhouses, each in charge of a library attendant. The clubhouse library attendants are on the payrolls of the bureau of clubs and

¹ The attendance on the Ancon and Cristobal playgrounds was increased materially by reason of the playgrounds being close to the school and used by the school children under supervision at recess times, and before and after school.

playgrounds, but under the supervision of the librarian. There is also a juvenile library at Balboa grade school.

There have been 5,111 volumes accessioned, shelf-listed, classified, catalogued, and prepared for circulation. On June 30, 1920, there were 1,139 registered borrowers, with a circulation of 1,625 volumes per month.

PERSONNEL BUREAU.

This bureau maintained the personnel file of each gold employee, accounting for the history of each employee's service, salary status, credits for leaves of absence, transportation, the organization status of the different divisions and bureaus, and the records of all new employees requisitioned from the United States. Individual reports of leave of absence totaled 28,000. Printed leave orders issued for the files of both the Isthmian and Washington offices numbered 159. Approximately 4,000 requests for free or reduced rates of transportation for employees and members of their families were issued by the bureau. Detailed records, approximating 5,000, of every position accredited to the organization of each division or bureau within the Isthmian organization were kept, showing the status of the position, whether filled or not, its record of salary status and incumbency. There were 538 authorities issued for free steamship transportation; 2,671 for reduced rates on the Panama Railroad Steamship Line; and 608 for employees' rates on various other steamship lines. As in many cases the authorization issued covered transportation for both the employee and family, the total number of persons for whom transportation was authorized greatly exceeded the number of authorizations. Additional free or reduced railroad transportation on the Isthmus included approximately 4,000 employees' free 24-hour trip tickets over the Panama Railroad, 1,575 employees' 120-trip official business passes, and a miscellaneous number of school passes and individual card passes.

Under the provisions of an act passed by the Sixty-sixth Congress for the retirement of employees in the classified civil service, the bureau arranged to commence the work of examining personnel files for the necessary report on employees who may be entitled to the benefits of the act.

The increasing number of changes in rates of pay, and the numbers of transfers within the Canal organization tended to increase the work of this bureau for the year. The actual rate of turnover for the year was, however, less than for 1917 or 1918 during which periods the separation and return of employees who entered military duty caused an unusual amount of detailed work.

PROPERTY BUREAU.

Four of the five sections into which this bureau is subdivided handle the actual property accounting for the entire Canal and railroad organization; the other handles work requests, requisitions, expendable invoices, correspondence and files. Accounts are carried with all responsible officials, approximating 160 for the fiscal year. The supervision of these accounts involves the renewal of memorandum receipts, and a physical check of property twice annually.

In addition the accounts of any responsible official entering on leave, under transfer or resigning are checked in each instance. This work includes the Canal and railroad, for both of which the transfer of office equipment, and the preparation of requisitions and specifications for the purchase of new equipment are handled. Based upon a count of the average of the different items shown for a period of six months' business, the following statement covers the principal items handled during the fiscal year:

Handled, posted, and filed:		
Property vouchers.....	20,294	
Surveys.....	1,580	
Foremen's orders.....	5,838	
Transfer receipts.....	1,624	
Prepared:		
Work requests.....	2,760	
Requisitions.....	6,018	
Expendable invoices.....	3,006	
Property invoices.....	5,440	
Memorandum receipts renewed.....	1,112	
Changes in responsible officials.....	652	
Accounts requiring recheck.....	182	
Entries on property returns.....	73,030	
Inspection trips and inventories.....	930	
Letters written.....	4,214	
Form letters and tracers.....	5,796	
Forms of all kinds used.....	274,848	
Pages of property returns transferred to new returns semiannually.....	91,156	

BUREAU OF PAY ROLLS.

The work of this bureau is best presented in the following tabular form:

TABLE NO. 4.—Statement of work of the bureau of pay rolls, July 1, 1919, to June 30, 1920.

	Coupon books.		Collected for rent and electric current.	
	Number issued.	Value.	Pay roll deduction.	Cash.
1919.				
July.....	78,390	\$419,145.00	\$10,192.39	\$171.04
August.....	82,641	444,662.50	9,960.47	137.57
September.....	81,016	445,055.00	9,996.18	149.19
October.....	81,525	457,580.00	10,127.26	157.73
November.....	78,901	448,916.92	10,004.15	149.80
December.....	95,022	551,930.95	9,928.05	151.72
1920.				
January.....	79,118	480,923.60	9,951.03	209.93
February.....	75,674	460,745.86	282.09	219.63
March.....	64,667	423,975.10	13,854.25	223.70
April.....	71,021	483,050.32	9,445.84	210.20
May.....	72,205	499,855.02	9,864.89	236.55
June.....	73,629	512,850.97	10,048.23	215.36
Total.....	933,809	5,628,691.24	113,654.83	2,262.42

TABLE NO. 4.—*Statement of work of the bureau of pay rolls, July 1, 1919, to June 30, 1920—Continued.*

	Pay receipts prepared—Panama Canal.					
	Gold.			Silver.		
	Num- ber.	Gross amount.	Net amount.	Num- ber.	Gross amount.	Net amount.
1919.						
July.....	3,585	\$633,915.77	\$380,209.02	16,583	\$575,009.14	\$337,051.99
August.....	3,677	640,909.20	389,811.19	15,289	573,868.42	319,680.79
September.....	3,691	642,450.96	384,105.13	14,718	554,570.90	312,691.22
October.....	3,794	666,703.08	400,411.55	14,471	573,160.50	328,662.99
November.....	3,781	650,611.09	501,858.12	13,151	499,327.85	281,446.60
December.....	3,771	698,258.81	526,520.93	13,996	544,732.46	274,027.14
1920.						
January.....	3,891	708,803.62	553,503.92	14,019	560,200.84	323,185.21
February.....	3,936	748,375.48	590,135.48	15,330	479,855.55	268,405.83
March.....	4,230	795,322.95	634,578.77	16,514	530,345.27	340,231.36
April.....	4,218	788,820.91	622,488.69	14,382	564,294.37	340,966.89
May.....	4,213	760,510.14	598,151.87	13,974	546,262.86	313,685.62
June.....	4,160	804,834.44	639,779.18	13,195	546,489.24	304,959.05
Total.....	46,947	8,539,516.45	6,221,553.85	175,622	6,548,117.40	3,744,994.69

	Pay receipts prepared—Panama Railroad.					
	Gold.			Silver.		
	Num- ber.	Gross amount.	Net amount.	Num- ber.	Gross amount.	Net amount.
1919.						
July.....	879	\$143,826.06	\$89,829.08	12,700	\$246,791.89	\$169,014.93
August.....	749	139,973.49	84,971.05	14,876	284,707.48	200,124.61
September.....	779	137,172.14	82,293.71	14,593	277,299.05	196,503.94
October.....	757	131,340.22	76,371.79	13,338	245,526.18	163,547.50
November.....	729	127,367.47	94,244.08	12,840	237,171.56	158,329.91
December.....	788	134,599.34	95,323.87	16,951	320,179.59	222,241.47
1920.						
January.....	755	135,028.22	100,967.73	17,133	303,869.29	219,393.44
February.....	797	136,263.43	102,625.03	15,254	261,024.42	184,490.57
March.....	905	149,101.23	112,869.72	19,569	328,421.36	259,148.21
April.....	878	150,644.84	114,537.54	18,024	330,677.93	244,202.10
May.....	852	144,840.06	108,685.49	15,999	317,689.91	222,875.38
June.....	840	143,652.87	108,020.98	15,432	311,117.91	212,597.16
Total.....	9,708	1,673,809.37	1,170,750.07	186,709	3,464,476.57	2,452,469.52

BUREAU OF STATISTICS.

This bureau continued its routine work of compiling vital statistics, which form part of the report of the chief health officer; statistics of navigation, which form part of the report of the marine superintendent; the handling of wage authorizations; and the compilation of matter for The Panama Canal Record. Numerous special studies of the Canal services were made for publication, or in answer to private inquiries.

Publicity, wage adjustment, cost of living studies, and the supervision of the decennial census formed part of the work carried on by this bureau.

SURVEYING OFFICER.

The surveying officer is charged with the inspection and making recommendation to the Governor as to disposition to be made of equipment or material which has become unserviceable, to make recommendations for relief of accountability for lost or damaged property, and to pass upon the responsibility of officers and employees for such loss or damage. He acts as chairman of the board of appraisal, property board, and board on destruction of public records; and handles loans of property on a rental basis, except leases of land. During the year the following surveys and appraisals were passed:

Two thousand nine hundred and ten formal requests for disposition on surplus, obsolete, unserviceable, and deteriorated property, which were disposed of by destruction, scrap recovery, sales to individuals and companies, and transfers to other departments of the Government. Total value, \$1,324,350.18.

Two hundred and twenty-one individual appraisals of plant, salvaged material, etc. Total value, \$496,101.65.

Thirty-four requests for destruction of obsolete public records, all of which were burned, the paper having no salvage value.

Twenty-two requests for loan of property (since February, 1920), revenue, \$747.28.

DIVISION OF SCHOOLS.

The division continued under the superintendence of Mr. A. R. Lang.

A survey of the schools during the past four years is given in the following statement:

	1917	1918	1919	1920
Number of school buildings.....	19	17	16	16
Buildings erected and converted.....	3	-----	2	-----
Number of employees in division.....	70	81	95	100
Number of supervisory force.....	2	3	3	3
Total expenditures (approximate).....	\$87,000	\$140,000	\$149,000	\$192,000
Estimated value of school property.....	\$100,000	\$560,000	\$560,000	\$560,000
Net enrollment.....	2,373	2,774	3,006	3,485
White schools.....	1,518	1,764	1,778	2,004
Colored schools.....	855	1,010	1,228	1,481
Per capita expense of maintenance (approximate) based on net enrollment.....	\$36.66	\$50.83	\$49.67	\$55.10
Total days of attendance.....	295,697.0	350,619.0	371,602.5	397,970.0
White schools.....	209,782.0	239,527.5	242,678.5	271,143.0
Colored schools.....	85,915.0	111,091.5	128,924.0	126,827.0
Average daily attendance.....	1,709.2	1,963.2	2,178.5	2,453.4
White schools.....	1,212.6	1,322.9	1,423.3	1,588.5
Colored schools.....	496.6	640.3	755.2	864.9
Absence of teachers on account of sickness, days.....	234.5	312.5	374.5	441.0
Average monthly wages of teachers:				
White.....	\$109.52	\$125.58	\$141.88	\$158.46
Colored.....	\$65.00	\$67.67	\$71.50	\$76.00
Tuition collected.....	\$3,510.19	\$4,364.64	\$4,057.00	\$5,358.00

The enrollment by schools was as follows:

	White schools.		Colored schools.	
	Gross.	Net.	Gross.	Net.
Balboa high.....	181	179		
Cristobal high.....	63	62		
Ancon—grades.....	406	347		
Balboa—grades.....	814	722	506	393
Pedro Miguel—grades.....	150	133	297	208
Gatun—grades.....	175	126	365	231
Cristobal—grades.....	489	435	351	223
Paraiso—grades.....			381	233
Empire—grades.....			288	193
Total.....	2,278	2,004	2,188	1,481
Total white and colored.....	1 4, 466	2 3, 485		

¹ Compared with 3, 405 for the school year 1918-1919.

² Compared with 3, 006 for the school year 1918-1919.

The enrollment by grades was as follows:

Schools.	Grade.												Total.
	1	2	3	4	5	6	7	8	9	10	11	12	
White.....	338	258	254	274	197	169	150	123	88	75	38	40	2,004
Colored.....	601	218	231	194	147	39	38	13	....	....	....	....	1,481
Total.....	939	476	485	468	344	208	188	136	88	75	38	40	3,485

In addition to the regular school work, which was conducted according to the highest standards in schools in the United States, the following matters seem of special importance or interest.

Physical examinations were conducted during the year in both the white and colored schools and proper remedies were prescribed for defects.

Manual training and household art classes were held at Cristobal for the white pupils of Gatun and Cristobal Schools and at Balboa for the white pupils of the Pedro Miguel, Ancon, and Balboa Schools.

Physical training and athletics were continued in the schools, under the supervision of the bureau of clubs and playgrounds. A more extended reference to this work will be found in the report of that bureau. The physical instruction applies to both girls and boys.

Music was continued and satisfactory progress was made, the improvement in the grade schools being especially marked.

At Cristobal a night school for Spanish was conducted, and at Balboa a night school for English, French, history, Spanish, shorthand, and manual training.

The Palmer method of business writing has been supervised for two years in the Canal Zone schools. Classes for teachers and pupils were held twice every three weeks. The improvement in writing during the past year has been marked, especially in the lower grades.

Junior Red Cross work was continued in the white schools, where every pupil is a member. This work was begun in the colored schools.

EDUCATION OF APPRENTICES.

On July 1, 1919, there were 44 apprentices taking the apprentice courses. Fourteen new apprentices were enrolled during the year, 10 graduated, 3 resigned before completing their apprenticeship, and 1 was discharged due to failure to progress satisfactorily. At the close of the year there were 48 apprentices, distributed as follows:

Blacksmiths.....	2	Pattern makers.....	1
Boilermakers.....	5	Pipefitters.....	4
Coppersmiths.....	1	Shipfitters.....	5
Chemists.....	1	Shipjoiners.....	3
Electricians.....	4	Shipwrights.....	3
Machinists:		Welders.....	1
General.....	16		
Automobile.....	1	Total.....	48
Molders.....	1		

The 10 apprentices who graduated were distributed as follows:

Machinists.....	4	Ship fitter.....	1
Blacksmiths.....	2	Boiler maker.....	1
Draftsman.....	1	Pipe fitter.....	1

The "Rules for the Employment of Apprentices," which were issued in printed form September 15, 1917, were revised, effective May 1, 1920. The main change consists in the method of making appointments. There are so many more applications for apprenticeships than there are vacancies that appointment after competitive examination was considered the most satisfactory way to handle the matter, and it is believed that those appointed in this manner will be more suitable. The new rules increase the maximum age at the time of appointment from 19 to 20 years, thus enabling the boys to get one more year of schooling before taking up the apprenticeships.

POLICE AND FIRE DIVISION.

This division continued under the direction of Mr. Guy Johannes. The following statement shows the force of the division June 30, 1920:

Stations.	Police.	Fire.		
		Paid.	Volunteers.	Total.
Headquarters.....	2	2		2
Detectives.....	7			
Balboa central station.....	42	15		15
Ancon.....	22			
Pedro Miguel.....	27	4	20	24
Corozal.....			9	9
Red Tank.....			20	20
Paraiso.....			26	26
Tug Cocoli.....			31	31
Tug Gorona.....			29	29
Oil Plant.....			29	29
Cristobal central station.....	47	18		18
Gatun.....	15	4	20	24
Monte Lirio.....	2		2	2
Gamboa.....	3		11	11
Frijoles.....			3	3
Tug Porto Bello.....			36	36
Tug Tabernilla.....			33	33
Penitentiary.....	16			
Total.....	183	43	269	312

POLICE SECTION.

In addition to the routine work of this division numerous confidential investigations and reports in connection with the protection of The Panama Canal and the general interests of the United States on the Isthmus were made. Labor troubles, resulting in a strike of the silver employees, also caused a great amount of extra work for the division during the latter half of the fiscal year.

During the year 4,202 persons were arrested, of whom 4,026 were males and 176 females, an increase of 220 as compared with the previous year. Two thousand eight hundred and ninety-eight arrests were made without warrants, 636 were made with warrants, and 668 were disposed of without trial.

A monthly average of 92.25 prisoners served sentences in the common jails during the year, and all those physically able were employed in the construction and repair of roads, and others were employed on janitor and miscellaneous work at police and fire stations. The total value of the labor performed by the prisoners amounted to \$19,486.94.

Five homicides were committed and in all cases but one the offenders were brought to trial.

Only one arrest was made for violation of the opium act, and due to the vigilance of the police this traffic was practically suppressed.

Monthly patrols of the interior sections of the Canal Zone were continued throughout the year to determine if any new clearings or cultivations were being made, or if any new buildings were being constructed by private parties in the depopulated areas. Twenty-three arrests for trespass on Canal Zone lands were made during the year, and 21 convictions were secured.

Fifty-four persons were deported from the Canal Zone by the police during the year. Of this number 49 were convicts who had completed terms of imprisonment, and 5 were persons who had been convicted of misdemeanor charges or who were deemed undesirable persons to be permitted to remain on the Canal Zone.

Plain clothes officers continued extensive and numerous investigations in connection with the protection of the Canal and enforcement of the travel regulations, in addition to the usual police work. Plain clothes officers effected 345 arrests on misdemeanor and felony charges, and investigations were also conducted in 255 cases which did not require arrest and many cases in which defendants could not be found.

A house-to-house canvass of the population of the Canal Zone was taken by the police force between August 20 and August 31, 1919, and again between June 10 and June 30, 1920. The enumeration consisted of an accurate count of the entire civilian population for the information of local officials, giving number of males, females, and children, and whether employees or nonemployees, but no detailed data, which would have required too much extra work for the police.

Sixty-five convicts were received at the penitentiary during the year. The aggregate sentences imposed on convicts amounted to 83 years 9 months and 21 days. Fifty-one convicts completed

terms of imprisonment and were discharged from prison, as compared with 64 discharged the previous year. These convicts had earned 4 years 10 months and 4 days "good time". Discharged convicts were deported in all cases permissible by law. At the close of the year 53 convicts remained in custody, as compared with 39 at the close of the previous year.

Most of the convicts were employed during the year on the construction of the new Paraiso-Gamboa road. A few were employed on a small farm adjacent to the penitentiary, and for the maintenance of the prison buildings and grounds, manufacture and repair of prison clothing, and other maintenance labor.

A considerable quantity of produce was raised on the small farm adjacent to the penitentiary and used in supplementing the food ration allowed the convicts. This produce aided considerably in offsetting the increased cost of food.

Number of arrests, by fiscal years, made on Canal Zone since organization.

Period.	Number of arrests.
June 2, 1904, to June 30, 1905.....	2, 130
July 1, 1905, to June 30, 1906.....	3, 748
July 1, 1906, to June 30, 1907.....	5, 831
July 1, 1907, to June 30, 1908.....	6, 075
July 1, 1908, to June 30, 1909.....	6, 275
July 1, 1909, to June 30, 1910.....	6, 947
July 1, 1910, to June 30, 1911.....	5, 959
July 1, 1911, to June 30, 1912.....	7, 055
July 1, 1912, to June 30, 1913.....	6, 627
July 1, 1913, to June 30, 1914.....	4, 911
July 1, 1914, to June 30, 1915.....	5, 157
July 1, 1915, to June 30, 1916.....	4, 480
July 1, 1916, to June 30, 1917.....	4, 881
July 1, 1917, to June 30, 1918.....	4, 426
July 1, 1918, to June 30, 1919.....	3, 982
July 1, 1919, to June 30, 1920.....	4, 202
Total.....	82, 696

Number of arrests, by months, made during fiscal year ended June 30, 1920.

Months.	Males.	Females.	Total.	With warrant.	Without warrant.	Disposed of without trial.
1919.						
July.....	296	27	323	61	235	27
August.....	274	25	299	33	239	27
September.....	327	10	337	55	247	35
October.....	305	18	323	71	188	64
November.....	289	15	304	39	235	30
December.....	311	9	320	47	229	44
1920.						
January.....	411	14	425	65	293	67
February.....	276	15	291	48	223	20
March.....	307	7	314	52	189	73
April.....	362	8	370	52	262	56
May.....	416	17	433	55	272	106
June.....	452	11	463	58	286	119
Total.....	4, 026	176	4, 202	636	2, 898	668

Arrests by stations, fiscal year ended June 30, 1920.

Station and substation.	Number of arrests.
Balboa Central Station	1,251
Ancon	304
Pedro Miguel	224
Cristobal Central Station	2,251
Gatun	121
Monte Lirio	5
Gamboa	46
Total	4,202

Statement of disposition of persons arrested, fiscal year ended June 30, 1920.

Disposition.	Number.	Per cent.
Tried in courts:		
Convicted	2,668	81.15
Dismissed	608	17.20
Continued on June 30, 1920	58	1.65
Otherwise disposed of on proper authority	3,534	100.00
Total persons arrested	4,202	

FIRE SECTION.

Periodical inspections of all government buildings, docks, storehouses, yards, etc., were conducted by the fire section throughout the year. Fire hose and fire extinguishers were maintained in good condition at all locations where such equipment was installed for special protection, and installations were made in many new buildings constructed during the year.

Fifteen volunteer fire companies were maintained on the Canal Zone until March 1, 1920, when this number was increased to 22 companies, being an increase of 7 companies over the number in existence at the close of the previous year. This increase was distributed as follows: Three new companies each for the tugs *Gorgona* and *Tabernilla*, and one additional company for the tug *Porto Bello*. Each company was composed of a maximum of 20 men, employees of The Panama Canal or Panama Railroad.

One hundred twenty-nine fires and 14 false alarms were reported during the year. Eighty-eight fires occurred in property of The Panama Canal, 21 in Panama Railroad property, 3 in United States Army property, 2 in United States Navy property, and 15 in private and United States Shipping Board property. Fifty-nine fires were in dry grass, brush, scrap, and rubbish.

The total losses from all fires during the year amounted to \$3,567,-083.85, of which \$1,970,000 represents loss due to a fire on the United States Shipping Board steamer *Marne*; \$1,502,000 on the United States Shipping Board steamer *Olockson*; \$47,000 loss to Army storehouse at Empire; \$8,000 to United States Army launch in Cristobal Harbor; \$12,000 to United States Navy boathouse at Darien; and \$15,000 to steamship *Crown of Galacia* in Cristobal Harbor. Aside from these fires, it will be noted that fire losses on the Canal Zone were very low.

Statement of fires and losses and property.

Fiscal year.	Number of fires.	False alarms.	Total damage.	Total property involved.
1977-1907.....	45	.....	\$100,000.00	\$1,300,000.00
1907-1908.....	71	12	46,170.50	1,097,619.45
1908-1909.....	92	6	16,934.92	1,624,893.65
1909-1910.....	123	10	3,237.04	1,212,335.19
1910-1911.....	233	14	53,077.44	2,256,210.01
1911-1912.....	315	18	12,653.58	1,826,995.58
1912-1913.....	202	18	22,520.97	1,041,450.19
1913-1914.....	207	8	21,376.96	1,993,012.61
1914-1915.....	142	13	153,286.95	2,465,654.18
1915-1916.....	86	11	28,418.47	1,651,122.11
1916-1917.....	104	9	3,191.25	1,044,752.59
1917-1918.....	69	5	259,351.60	6,165,991.38
1918-1919.....	90	8	40,805.13	9,256,369.35
1919-1920.....	129	14	3,567,083.85	8,906,017.28

DIVISION OF CIVIL AFFAIRS.

This division continued under the direction of Mr. C. H. Calhoun.

BUREAU OF POSTS.

The total receipts from the postal service were \$138,391.60, as compared with \$136,627.40 for the preceding year, an increase of \$1,764.20. The postage sales amounted to \$87,096.72, as compared with \$81,343.78 for the year ended June 30, 1919, and \$1,782.53 were collected for second-class matter, as compared with \$2,553.88 during the preceding year. Interest received on deposit money order funds amounted to \$22,141.38 during the year, as compared with \$25,746.20 during the preceding year. Table No. 8 accompanying the report of the chief of the division of civil affairs shows in detail the receipts during the present year as compared with the year ending June 30, 1919.

The Canal Zone postal service is still required by the Executive order of December 3, 1904—one of the Executive orders of the so-called "Taft agreement"—to purchase from the Republic of Panama all postage stamps sold in the Canal Zone post offices at 40 per cent of their face value. This 40 per cent subsidy to the Panaman Government amounted to \$33,783.97 during the fiscal year. The revenues from the postal service would have exceeded the expenditures for the fiscal year by \$70,178.86 if the 40 per cent subsidy on stamp sales had not been paid and if all mail matter had been paid for at regular rates.

There were 125,123 money orders, including deposit orders, issued during the year, amounting to \$3,199,996.98, on which fees amounting to \$10,207.85 were collected. Compared with the preceding fiscal year, there was a decrease of 15,495 in the number of orders issued, an increase of \$91,295.32 in the amount and a decrease of \$216.31 in the fees collected.

Deposit money orders issued during the year had a total value of \$1,143,225, and payments of deposit money orders during the same period aggregated \$1,043,080. The balance on deposit to this account on June 30, 1920, was \$520,070, as compared with \$419,925 on deposit at the close of the previous year.

In the registry division of the post offices 273,778 letters and parcels were handled, as compared with 292,698 for the previous fiscal year. Of this number 146,523 registers were dispatched, subdivided as follows: Twenty-eight thousand seven hundred and seventy-nine domestic letters, 3,808 domestic parcels, 25,642 foreign letters, 4,804 foreign parcels, 79,991 official letters and parcels registered free, 88 c. o. d. parcels, and 3,411 domestic parcels insured. Compared with the preceding year there was an increase of 10,168 registered letters and registered and insured parcels dispatched.

Customs duty was paid to the Republic of Panama to the amount of \$33,452 on 14,302 mail parcels for nonemployees and on dutiable articles imported by employees, as compared with \$25,289.71 on 9,591 parcels during the preceding year.

Under arrangements entered into with the United States Post Office Department in 1916 all transit United States mail and foreign closed mail destined to the west coast of Central and South America is consigned to the director of posts of the Canal Zone. This arrangement continues to produce most gratifying results both as to the more rapid onward dispatch of the mails and a very material economy in the cost of its transportation. In this connection the following excerpt from the report of the Postmaster General for the fiscal year ended June 30, 1919, is quoted below:

The arrangement which became effective November 1, 1916, whereby all mails dispatched from the United States for the west coast of South America via the Isthmus of Panama are consigned to the director of posts of the Canal Zone, who supervises their onward dispatch, continued to operate with gratifying results and further reduced the cost of the Isthmus transit of United States mails, the cost for the fiscal year 1919 being \$12,773.94, or \$4,609.12 less than the cost for the fiscal year 1918 and \$94,820.51 less than the year 1916.

Attention is called to the fact that by this arrangement the cost of transporting and handling transit United States mails at the Canal Zone for the fiscal year ended June 30, 1919, was \$136,958.98 less than in the year 1913, before the opening of the Canal in 1914, although the volume of mail has increased. The figures for the fiscal year ended June 30, 1920, are not yet available.

During the year ended June 30, 1920, there was received and dispatched a total of 107,161 sacks of transit mail from New York and New Orleans, an increase of 16,070 sacks, or nearly 18 per cent, over the previous fiscal year. Of this total, 94,733 sacks originated in the United States and 12,428 in foreign countries.

A count of all mail matter received, dispatched, and handled in transit in the Canal Zone was made during the period from October 16, 1919, to November 15, 1919, inclusive. During the same period all mail matter handled free under "official business" frank was weighed. The result showed that 848,626 pieces of all classes of mail were handled.

Of the total of 848,626 pieces of mail handled, 228,153 pieces, or 26 per cent, were handled under official frank without postage.

BUREAU OF CUSTOMS.

The bureau of customs has been conducted under regulations embodied in Governor's Circular No. 679 of July 14, 1914, as revised on November 21, 1914. The work is closely allied to that of the marine division, the quarantine service, the division of police, and the Panama Railroad Company, and the bureau of customs cooperates

with all these branches in order to avoid unnecessary duplication of work in connection with the handling of shipping and cargoes.

There has been a large increase in shipping at Canal ports during the past year. The total number of vessels entered was 6,023 and the total number cleared was 6,016, as compared with 4,604 entered and 4,590 cleared during the previous fiscal year.

The total number of American vessels entered was 2,779 and the total number of American vessels cleared was 2,778, as compared with 1,959 entered and 1,940 cleared during the fiscal year 1919.

The increase in the total number of vessels entered during the year—an increase of approximately 118 per month, or almost 4 a day—has resulted in a large increase in the work of the customs force.

SHIPPING COMMISSIONER.

The chief of the division of civil affairs is also shipping commissioner and the chief customs inspectors are deputy shipping commissioners. According to law the shipping commissioner and his deputies have the same powers as shipping commissioners in United States ports and American consuls in foreign ports with respect to American seamen.

The ports of the Canal have a peculiar status, as under some circumstances they are considered American ports and under others they are considered foreign ports, which makes it necessary for the shipping commissioner and deputy shipping commissioners in the Canal Zone to be familiar with the duties of American consuls in foreign ports and shipping commissioners in American ports.

The increase of 820 American vessels entered and 838 cleared from Canal Zone ports during the present year, as compared with the year 1919—more than 2 each day—has created a great deal of additional work. There were 4,281 seamen shipped on American vessels and 3,278 seamen discharged, as compared with 4,182 shipped and 3,453 discharged during the preceding year. There were 624 American seamen lodged or subsisted in the Canal Zone during the year. Of this number, 288 were returned to the United States at the expense of the appropriation for the relief of destitute American seamen, and the remaining 336 were signed on vessels as seamen or workaways and returned to the United States without expense to the Government.

ADMINISTRATION OF ESTATES.

During the year 258 estates of deceased and insane employees of The Panama Canal and the Panama Railroad Company were administered, as compared with 161 estates during 1919, and there were 26 estates in course of settlement on June 30, 1920.

The amount involved in the settlement of the 258 estates was \$16,314.77, of which \$15,446.87 belonged to decedents' estates and \$867.90 to the estates of insane persons.

THE COURTS.

The district courts, one each at Cristobal and Balboa, handled fewer cases this year than last. There were 359 cases pending at the beginning of the year; 875 were filed, 952 settled, and 282 pending on June 30, 1920. Of the cases pending the first of the year 158 were civil, 119 probate, and 82 criminal. Cases filed included 157

civil, 348 probate, and 370 criminal. Those settled included 189 civil actions, 101 of which were decided, 83 dismissed, 4 transferred, and 1 reported off; 337 probate cases; and 426 criminal actions, 51 of which were acquitted, 253 convicted, 67 not proessed, 52 dismissed, and 3 transferred. There were 195 sessions of court. A total of 879 marriage licenses was issued and 5 deeds recorded. Collection of costs, fines, forfeitures, fees, etc., amounted to \$9,431.17.

The magistrates' courts, one each at Cristobal and Balboa, had 13 civil and four criminal cases over from last year's business. There were 3,835 cases docketed during the year, 3,744 criminal and 91 civil; 3,838 cases were disposed of, leaving 3 civil and 11 criminal actions pending at the close of the year. Collections from all sources amounted to \$17,863.91.

Under the provisions of an Executive order of May 10, 1911, petitions were issued during the year from the magistrate's court to the district judge for the commitment of 61 persons to the Corozal Asylum for observation; these included 32 white persons, males (including 20 soldiers); 29 negroes, 24 male and 5 female.

SPECIAL ATTORNEY AND DISTRICT ATTORNEY.

The reports of the special attorney and district attorney are printed as appendixes of the Governor's report.

MARSHAL FOR THE CANAL ZONE.

The marshal for the Canal Zone received 755 writs, subpoenas, and other processes for service during the year, of which 694 were served and 61 unserved, as the parties concerned could not be located on the Zone. The marshal, or his deputy, attended at Balboa district court 135 days and at Cristobal district court 60 days. Fees collected and turned over to the collector of The Panama Canal totaled \$448.60, and the amount of fees paid witnesses for the Government during the year was \$212.

RELATIONS WITH PANAMA.

Negotiations by correspondence or personal conference between the executive secretary of The Panama Canal and the Secretary of Foreign Relations of the Republic of Panama included the following subjects, in addition to routine matters:

- Conferences between representatives of the Republic of Panama and The Panama Canal regarding alleged abuse of commissary privileges.

- Sales of road-building material, unobtainable elsewhere, to Panaman Government.

- Inspection of condition of Bolivar Asylum, Panama.

- Requests of Panaman Government for the appearance of Panama Canal employees as witnesses in Panama courts.

- Panama advised regarding quality of meat from castrated and uncastrated cattle.

- Adoption of uniform regulations for issuance of chauffeurs' licenses.

- Reinspection by customs employees of Panama of baggage already inspected by Canal Zone inspectors.

- Bonded warehouses in Republic of Panama.

- Preference to Panaman Government in the leasing of certain lots in Colon.

- Requests for data regarding material and supplies sold by The Panama Canal to private concerns for purpose of constructing buildings in Canal Zone.

- Transfer of the United Fruit Company's wireless station from Bocas del Toro to port of Almirante authorized by Panaman Government without prior approval of the Governor of The Panama Canal.

- Tariff rates for telegraphic and telephonic messages sent over wires operated by the Panaman Government.

- Request of the board of directors of the Santa Tomas Hospital for removal of the superintendent.

Complaints of planters of Taboga regarding alleged regulation prohibiting their shipping fruits on southbound steamers.

Advice of Secretary of Foreign Relations requested regarding pardon of Convict Francisco Zaldivar.

Docking charges on Republic of Panama boat *San Blas* at Pier No. 2.

Proposed arrangement of West India Oil Co. with Panaman Government for securing drawback.

Transportation of liquors through Canal Zone for towns in interior of Panama contiguous to the Canal Zone.

Clearing boundary line between Canal Zone and the Republic of Panama.

Acquisition of certain territory for military purposes at Largo Remo, near mouth of the Chagres River.

Inspection of cattle as sanitary measure.

Operation of a saloon near Canal Zone boundary in Colon in violation of decree of Republic of Panama.

Proposed construction of storm sewer in the vicinity of the market, Panama City.

Exportation of Panaman silver currency by Panama Canal employees.

Deportation of foreign prostitutes from Panama to their native land.

Increased payments necessary to cover cost of cleaning streets and collecting garbage in Panama City.

Construction of new Santo Tomas Hospital.

Articles of wearing apparel stolen from Army stores and sold to a merchant in Panama.

Passports for alien enemies through Isthmus from foreign ports.

Collection of duty on timber exported from Panaman forests.

Petition of Colon coachmen for increase in rates.

Resolution No. 378 of Republic of Panama denying refund of customs duties.

Condition of lights on Pier 2, Colon.

Transfer of lease rights of lot 13, block 19, Colon, for fire station instead of post-office site.

Suit against Panama Railroad for portion of Javillo fill.

Water supply for the town of New Chagres.

Authentication of documents emanating from the judicial authorities of the Canal Zone for the Republic of Panama.

Cooperation of Republic of Panama with Panama Canal in matter of strike of silver employees.

Payment requested of Republic of Panama of amount due health department, \$160,000.

Request of Panaman Government for telephone line to Taboga Island.

Charges for inspection of cattle and meat at the municipal slaughter houses in Panama and Colon.

Panaman Government objects to use as silver quarters of certain buildings on Panama Railroad stable lots on account of inflammables being stored near by.

Land required for military purposes on Taboga Island.

Special commissioners of Republic of Panama to take up matters of interest to Panama with Secretary of War.

Report on physical condition of Henry N. Schneider, an American soldier, wounded in Panama.

Final report of the joint commission.

Free entry of certain goods for the Knights of Columbus for free distribution among enlisted men.

Suggested change in Panaman customs regulations to allow nonemployees to bring in reasonable amount of cigars, cigarettes, or tobacco for their own use.

Memorial protesting against extradition of certain merchants of Colon implicated in thefts from Panama Railroad docks.

* LEGISLATION.

The various acts of Congress and Executive orders affecting The Panama Canal and the Canal Zone appear as an appendix to the Governor's report.

Respectfully submitted.

C. A. McILVAINE,
Executive Secretary.

Brig. Gen. CHESTER HARDING, *United States Army,*
Governor, The Panama Canal, Balboa Heights, Canal Zone.

APPENDIX TO APPENDIX F.

REPORT OF CHIEF OF DIVISION OF CIVIL AFFAIRS, EXECUTIVE DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *July 29, 1920.*

SIR: I have the honor to submit the following report of the division of civil affairs for 1920:

BUREAU OF POSTS.

The total receipts from the postal service, including box rents, payments from the Panama Railroad Company, payments from the Panaman Government for handling its mail between Panama and Colon, payments from the United States Post Office Department for handling United States transit mails, interest on deposit money order funds, sales of postage stamps and other stamped paper, collections for second-class mail matter, money-order fees, and miscellaneous receipts, were \$138,391.60, as compared with \$136,627.40 for the preceding year, an increase of \$1,764.20. The sale of postage stamps and postal cards, including the receipts from the sale of stamp books, amounted to \$87,096.72, as compared with \$81,343.78 for the year ended June 30, 1919, and \$1,782.53 were collected for second-class matter, as compared with \$2,553.88 during the preceding year. Interest received on deposit money order funds amounted to \$22,141.38 during the year, as compared with \$25,746.20 during the preceding year. There is attached hereto a detailed statement showing the receipts during the present year as compared with the year ending June 30, 1919.

The Canal Zone postal service is still required by the Executive order of December 3, 1904—one of the Executive orders of the so-called "Taft agreement"—to purchase from the Republic of Panama all postage stamps sold in the Canal Zone post offices at 40 per cent of their face value. This 40 per cent subsidy to the Panaman Government amounted to \$33,783.97 during the fiscal year. The Panama Railroad Company and commissaries are permitted to use the official business frank in the Canal Zone for a consideration of \$100 per month; whereas an actual count of all mail matter handled during one month of the year showed that, if postage had been required at the regular rates, the amount of \$1,699.13 would have been collected during that month for postage. The bureau of posts carries free the official mail of The Panama Canal and the Army and Navy within the Canal Zone, and pays transportation charges to the United States. There is attached hereto a statement showing that the revenues from the postal service would have exceeded the expenditures for the fiscal year by \$70,178.86 if the 40 per cent subsidy on stamp sales had not been paid and if all mail matter had been paid for at regular rates.

NUMBER OF POST OFFICES.

The number of post offices in operation (16) remained unchanged during the year, except during the period from August 1 to 15, 1919, inclusive, when the post offices at Fort Amador, Fort Randolph, Paraiso, Empire, and Coco Solo were closed temporarily due to the fact that the funds at first allotted for the postal service for the fiscal year were insufficient to continue all post offices in operation.

LOCK BOXES.

During the months of May and June, 1920, 1,778 additional lock boxes were received and installed in post offices. The total cost of the new lock boxes was \$5,923, and it is estimated that the total revenue from rentals for the period of one year will amount to \$4,836.40.

The box rents collected during the year amounted to \$8,776.55, as compared with \$8,268.20 for the previous year.

MONEY ORDERS.

There were 125,123 money orders, including deposit orders, issued during the year, amounting to \$3,199,996.98, on which fees amounting to \$10,207.85 were collected. The average amount of each order was \$25.57. Compared with the preceding fiscal year, there was a decrease of 15,495 in the number of orders issued, an increase of \$91,295.32 in the amount, and a decrease of \$216.31 in the fees collected.

Deposit money orders issued during the year had a total value of \$1,143,225, and payments of deposit money orders during the same period aggregated \$1,043,080. The balance on deposit to this account on June 30, 1920, was \$520,070, as compared with \$419,925 on deposit at the close of the previous year. On June 30, 1920, there were still open old postal savings accounts aggregating \$509. The total amount on deposit at all post offices on June 30, 1920, including deposit money orders, old postal savings accounts, and unpaid fee-paid money orders in favor of the remitter, was \$530,267.56, as compared with \$437,534.50 on June 30, 1919.

Interest amounting to \$7,987.08 was paid on deposit money orders cashed during the fiscal year, as compared with \$8,604.24 for the year ended June 30, 1919. Interest received from banking institutions for money-order funds on deposit amounted to \$22,141.38, thus leaving a net balance of \$14,154.30 in the money-order interest account during the fiscal year.

REGISTERED, INSURED, AND C. O. D. MAIL.

In the registry division of the post offices 273,778 letters and parcels were handled, as compared with 292,698 for the previous fiscal year. Of this number, 146,523 registers were dispatched, subdivided as follows: 28,779 domestic letters, 3,808 domestic parcels, 25,642 foreign letters, 4,804 foreign parcels, 79,991 official letters and parcels registered free, 88 c. o. d. parcels, and 3,411 domestic parcels insured. Compared with the preceding year, there was an increase of 10,168 registered letters and registered and insured parcels dispatched.

There were delivered during the year at all post offices 104,728 registered letters and 22,527 insured and c. o. d. packages, a total of 127,255, as compared with 156,343 for the previous fiscal year. Balboa was designated as an exchange office for the receipt and dispatch of registered and other matter for the west coast of Central and South America on November 1, 1919. Ancon, Balboa, and Cristobal, as exchange offices, handled 84,286 registered articles, a decrease of 167,243 from the previous year. Of these, 2,406 passed through the Ancon office, 6,937 through Balboa, and 74,943 through the Cristobal post office to and from foreign countries. This decrease is accounted for by the removal of censorship of mail matter which, during the war, necessitated the handling of all transit registered matter through the post office at Cristobal.

Approximately 80 per cent of the local registered mail received at Canal Zone post offices was mailed under official cover of The Panama Canal, Panama Railroad Company, and the United States Army and Navy for which no fees were paid.

DUTIABLE PACKAGES.

Customs duty was paid to the Republic of Panama to the amount of \$33,452 on 14,302 mail parcels for nonemployees and on dutiable articles imported by employees, as compared with \$25,289.71 on 9,591 parcels during the preceding year. During the year 16,226 parcels were delivered at Canal Zone post offices on submission of form P. C. 1160, as compared with 14,640 during the previous year.

DUPLICATE MONEY ORDERS AND INVESTIGATIONS.

In addition to the direction and supervision of post offices and general correspondence pertaining thereto, the office of the director of posts issued 540 duplicates of lost or stolen money orders, investigated approximately 300 cases of the loss, rifling or nondelivery of registered, insured and c. o. d. mail, undertook special investigations for the United States Post Office Department relative to mail in transit through the Canal Zone, made inspections of all post offices, and issued 70 numbered circulars of instructions to all postmasters.

DEAD LETTER SECTION.

All unclaimed mail matter of local origin is opened in the bureau of posts and disposed of in accordance with the Postal Laws and Regulations. Unclaimed first-class matter other than that mailed in the Canal Zone is returned by the dead letter section to the country of origin for disposition. Unclaimed matter of other classes is disposed of by sale or, if of no value, destroyed. Insufficiently addressed letters are advertised in The Panama Canal Record and delivered, or returned to the senders.

VIOLATIONS OF POSTAL LAWS AND REGULATIONS.

During the year one case was reported of the misuse of canceled postage stamps. The case was not prosecuted for the reason that the identity of the sender of the letter on which the stamp was used could not be learned.

There were five cases detected of the misuse of penalty envelopes, but no arrests were made in connection therewith.

One arrest was made during the year for the rifling of ordinary letters by an employee. The offender was convicted on a charge of petit larceny and fined \$5.

One arrest was made for an attempt to open a mail box in the Ancon post office without proper authority, for which the offender was prosecuted on a charge of disorderly conduct, found guilty, and sentenced to pay a fine of \$25 and to serve 30 days in jail.

One arrest was made for the forgery of a name on a request for the free entry of a mail parcel in an attempt to secure the release of the parcel from a Canal Zone post office without the payment of the proper customs duty to the Republic of Panama. The offender was arraigned in the magistrate's court, and ordered held for trial in the district court. The case was dismissed when it came up for trial in the higher court.

DISPATCHES TO UNITED STATES AND OTHER COUNTRIES.

During the fiscal year a total of 2,619 dispatches were made to 100 different exchange offices by the post office at Cristobal, and 1,076 dispatches were made to 40 different exchange offices by the post office at Balboa, which was designated as an exchange office for the west coast of South and Central America on November 1, 1919.

DELIVERY OF MAIL TO SHIPS IN TRANSIT.

The delivery of mail for crews and passengers of ships in transit through the Canal and for ships touching at Canal ports was continued during the past year with certain modifications. Mail matter for vessels of certain steamship lines operating on a more or less regular schedule is delivered to the local agents of the line. Delivery of mail to all other vessels is effected directly to the vessel through boarding officers or pilots, upon arrival of ships at Cristobal or Balboa, and through the Gatun and Pedro Miguel post offices while ships are in transit through the Canal.

Boarding officers of the customs service are prepared to sell stamps, accept letters for registration, and take applications for money orders from passengers and crews of vessels in transit, issuing receipts in each case and transacting the business for them through Canal Zone post offices.

UNITED STATES TRANSIT MAIL.

Under arrangements entered into with the United States Postal Department in 1916 all transit United States mail and foreign closed mail destined to the west coast of Central and South America is consigned to the director of posts of the Canal Zone. This arrangement continues to produce most gratifying results both as to the more rapid onward dispatch of the mails and a very material economy in the cost of its transportation. In this connection, the following excerpt from the report of the Postmaster General for the fiscal year ended June 30, 1919, is quoted below:

The arrangement which became effective November 1, 1916, whereby all mails dispatched from the United States for the west coast of South America via the Isthmus of Panama are consigned to the director of posts of the Canal Zone, who supervises

their onward dispatch, continued to operate with gratifying results, and further reduced the cost of the Isthmus transit of United States mails, the cost for the fiscal year 1919 being \$12,773.94, or \$4,609.12 less than the cost for the fiscal year 1918, and \$94,820.51 less than the year 1916.

Attention is called to the fact that by this arrangement the cost of transporting and handling transit United States mails at the Canal Zone for the fiscal year ended June 30, 1919, was \$136,958.98 less than in the year 1913, before the opening of the Canal in 1914, although the volume of mail has increased. The figures for the fiscal year ended June 30, 1920, are not yet available.

During the year ended June 30, 1920, there was received and dispatched a total of 107,161 sacks of transit mail from New York and New Orleans, an increase of 16,070 sacks, or nearly 18 per cent over the previous fiscal year. Of this total 94,733 sacks originated in the United States, and 12,428 in foreign countries. This mail was received from 196 steamers, and was dispatched on 329 steamers. A total of 11,673 sacks was forwarded by rail to connecting steamers at Balboa, and of this total 10,466 originated in the United States and 1,207 in foreign countries.

COUNT OF MAIL MATTER.

A count of all mail matter received, dispatched, and handled in transit in the Canal Zone was made during the period from October 16, 1919, to November 15, 1919, inclusive. During the same period all mail matter handled free under "official business" frank was weighed.

The result showed that 848,626 pieces of all classes of mail were handled, of which 325,040 were dispatched, 380,436 received, and 143,150 handled in transit.

Of the 325,040 pieces of mail matter dispatched, postage was paid on 157,275 ordinary letters, 26,252 cards, 14,412 papers and packages, 4,444 registered letters, and 758 other pieces of registered mail, a total of 203,141 pieces. The remaining 121,899 pieces of mail were dispatched under official frank, and included 106,631 ordinary letters, 4,134 cards, 4,480 packages, 3,800 registered letters, and 2,854 registered parcels.

Of the 380,436 pieces of mail matter received, postage was paid on 176,438 ordinary letters, 94,748 other pieces of ordinary mail, 2,619 registered letters, and 1,851 registered and insured parcels, a total of 275,656 pieces. The remaining 104,780 pieces were received under official frank, and included 93,374 ordinary letters, 5,371 ordinary packages, 4,368 registered letters, and 1,667 registered and insured parcels.

Mail matter in transit comprises all classes of mail matter received and dispatched by the exchange offices at Ancon and Cristobal to the cities of Panama and Colon, and to all countries in the Postal Union. Of the 143,150 pieces of mail matter handled in transit, postage was paid on 118,814 ordinary letters, 1,096 parcels, 17,197 other pieces of second and third class matter, and 4,569 registered pieces, a total of 141,676. The remaining 1,474 pieces of mail matter were received and dispatched under official frank, and included 1,107 ordinary letters, 53 parcels, and 314 pieces of registered mail.

Of the total of 848,626 pieces of mail handled, 228,153 pieces, or 26 per cent, were handled under official frank without postage.

Fifty-seven per cent of the local ordinary mail received at Canal Zone post offices, was official matter; and 80 per cent of the local registered mail received at Canal Zone post offices was mailed under official frank.

The total weight of official matter handled during the month, including letters, packages, and sacks, was 31,964 pounds 13 ounces. The weight of the official letters and cards dispatched was 11,320 pounds, and the weight of the official packages dispatched was 20,644 pounds. Had postage been paid on the official matter dispatched \$3,550.62 would have been collected on the letters and cards, \$1,067.74 on the packages, and the registry fees on the registered matter dispatched would have amounted to \$666.30, a total of \$5,284.66.

BUREAU OF CUSTOMS.

The bureau of customs has been conducted under regulations embodied in Governor's Circular 679 of July 14, 1914, as revised on November 21, 1914. The work is closely allied to that of the marine division, the quarantine service, the division of police, and the Panama Railroad Company, and the bureau of customs cooperates with all these branches in order to avoid unnecessary duplication of work in connection with the handling of shipping and cargoes.

MOVEMENTS OF VESSELS.

There has been a large increase in shipping at Canal ports during the past year. The total number of vessels entered was 6,023, and the total number cleared was 6,016, as compared with 4,604 entered and 4,590 cleared during the previous fiscal year.

The total number of American vessels entered was 2,779, and the total number of American vessels cleared was 2,778, as compared with 1,959 entered and 1,940 cleared during the fiscal year 1919.

The increase in the total number of vessels entered during the year—an increase of approximately 118 per month or almost four a day—has resulted in a large increase in the work of the customs force.

MERCHANDISE FOR REPUBLIC OF PANAMA.

All merchandise arriving at Cristobal and Balboa, destined to persons or firms in the Republic of Panama not connected with The Panama Canal, the Panama Railroad Company, or the United States Army or Navy, is in the custody of the Canal Zone customs until submission of the necessary papers from Panaman officials showing that duty has been paid. Permits for 6,635 releases were granted at Cristobal during the year, and 48 releases were authorized at Balboa, where the greater part of such cargo is forwarded by railroad to Panama City, there to be taken in charge by the Panaman customs officials.

FREE ENTRY OF MERCHANDISE.

Prior to September 8, 1919, after requests for free entry on Form P. C. 164 had been approved by this office for the executive secretary, final approval was given by Panaman customs officials in Colon, but now they are finally approved by the secretary of finance and treasury of the Republic of Panama. During the fiscal year 1920 the number of requests accomplished was 1,461, as compared with 1,128 for the previous year.

ATTEMPTED SMUGGLING.

There were two arrests during the year for attempted smuggling. In one case the defendant was found guilty and fined \$20, and in the other case a demurrer was filed by the attorney for the defendant claiming that no violation of the Canal Zone laws had been committed inasmuch as no customs duties are collected in the Canal Zone, and that, if any violation of the law had been committed, it was against the laws of the Republic of Panama. The demurrer was sustained by the court and the case dismissed. The question of legislation to meet this situation is now under consideration.

OPIUM TRAFFIC.

No attempts to smuggle opium through the Canal Zone into the Republic of Panama were detected by employees of the bureau of customs during the year.

HOUSEHOLD INSPECTIONS.

Under an agreement with the United States Treasury Department the bureau of customs is authorized to inspect and seal miscellaneous goods of American manufacture and household effects which have been purchased and used abroad for more than one year belonging to employees of The Panama Canal, the Panama Railroad Company, and the United States Government, which are intended for shipment by freight to the United States. These goods are then admitted into the United States free of duty without further inspection. There have been 288 such inspections during the fiscal year, covering 1,550 pieces of freight, as compared with 583 inspections and 4,467 pieces of freight in 1919.

As this particular inspection service is only for the purpose of assisting employees in returning household goods to the United States, and is of no real or incidental advantage to the bureau of customs, Panama Canal Circular 679-7 was issued under date of June 21, 1919, directing that, effective July 1, 1919, in addition to the charge of \$1 for declaration of inspected household goods, a charge of \$1 per hour should be made for the time spent by customs inspectors away from their regular duties on the inspection of household goods. During the year the sum of \$557 was collected for the time devoted to the inspection of household goods by the customs inspectors at Balboa, and \$356.50 for the time of customs inspectors at Cristobal while engaged on this work.

The decreased number of inspections during the year, as compared with the number for 1919, is due to the fact that post supply officers of the United States Army on the Isthmus were authorized, effective October 30, 1919, to make such inspections of goods intended for shipment by freight to the United States by Army officers.

CERTIFICATION OF INVOICES.

The bureau of customs certifies invoices covering ordinary shipments from the Canal Zone to the United States, using forms identical with those prescribed for certification by American consuls in foreign ports. Including the invoices for household inspections, above

mentioned, there were 1,420 invoices thus certified during the year, as compared with 1,323 in 1919. Fees for this service amounted to \$240 at Balboa, and to \$461 at Cristobal. Invoices for the Panama Railroad Company and departments of The Panama Canal are certified without charge.

SPECIAL CUSTOMS SERVICE.

In order to facilitate the discharge of passengers from vessels after the usual working hours and on Sundays and holidays at the terminal ports of the Canal, Circular 679-8 was issued by the Governor under date of August 7, 1919, providing that, effective September 1, 1919:

1. The bureau of customs shall furnish customs inspectors for inspection of passengers' baggage between the hours of 6 p. m. and 7 a. m. and on Sundays and holidays only upon the request of the master or authorized agent of any vessel calling at the ports of Balboa and Cristobal.

2. A charge will be made for such service against the vessel for which the service is rendered on the basis of \$5 for each customs inspector engaged between the hours of 6 p. m. and 11 p. m., or fraction thereof, on any work day, and \$10 for each inspector engaged after 11 p. m.; and for service on Sundays and holidays a charge of \$10 will be made for each inspector engaged between the hours of 7 a. m. and 6 p. m. and 6 p. m. and 11 p. m.

3. The number of customs inspectors who may be required to inspect passengers' baggage of any vessel will be determined by the chief customs inspectors, or designated subordinate officers, based on their information and knowledge of the requirements.

Since the above-mentioned circular became effective, there has been collected from vessels requesting such special service the sum of \$830 at Balboa and the sum of \$2,105 at Cristobal.

PROHIBITED ALIENS.

Panama Canal Circular 714-1, of April 25, 1917, charges the bureau of customs with the exclusion of Chinese from the Canal Zone. During the fiscal year, 363 Chinese arrived as passengers at Balboa and 127 at Cristobal in transit to the Republic of Panama and other countries, making a total of 490, as compared with 251 for the previous fiscal year. Of this number 184 were admitted to the Republic of Panama by authority of that Government, and the others, with the exception of nine awaiting transportation at the end of the year, either proceeded on their journey or were returned to the port of embarkation. Chinese in transit can make arrangements to be released in the Canal Zone under bond, and 97 such bonds were accepted at the port of Balboa, and 7 at the port of Cristobal, during the year.

Chinese crews are also checked before a ship leaves a Canal Zone port, in order to see that no illegal landings have been made, and 379 crews have been so checked during the year, as compared with 324 for the previous fiscal year.

The number of prohibited alien passengers handled was almost double, and 55 more Chinese crews were checked during the year than during the previous fiscal year.

SHIPPING COMMISSIONER.

The chief of the division of civil affairs is also shipping commissioner, and the chief customs inspectors are deputy shipping commissioners. According to law the shipping commissioner and his

deputies have the same powers as shipping commissioners in United States ports and American consuls in foreign ports with respect to American seamen.

The ports of the Canal have a peculiar status, as under some circumstances they are considered American ports, and under others they are considered foreign ports, which makes it necessary for the shipping commissioner and deputy shipping commissioners in the Canal Zone to be familiar with the duties of American consuls in foreign ports and shipping commissioners in American ports.

The shipping commissioner and his deputies supervise the signing on and signing off of all American seamen (i. e., seamen on American vessels) engaged or discharged in the Canal Zone, including the payment of the wages of such seamen, the approval of allotments, deductions, fines, and claims for overtime; receive wages of deceased and deserting seamen for deposit and proper disposition according to law; procure seamen for vessels at Canal Zone ports; discharge for hospital treatment sick and injured seamen and attend to their maintenance and return to the United States after their discharge from the hospital; maintain and return to the United States destitute American seamen found in the Canal Zone and also those sent to the Canal Zone by American consuls for shipment to the United States; take charge of the wages and effects of deceased seamen and make disposition thereof according to law; keep a register of the names and characters of seamen; supervise the operation of the seamen's institutes which are conducted by the Salvation Army at Balboa and Cristobal, and arrange for the care and subsistence of seamen at these institutions; inspect the log books, crew lists, and shipping articles of vessels to see that the provisions of law have been carried out; prepare shipping articles and extend and amend them; investigate complaints of seamen against the officers of vessels and of officers of vessels against seamen; and arbitrate disputes and disagreements with regard to the provisioning of vessels, conditions of employment, treatment, wages, advances and allotments, conduct of seamen, and all other differences between officers and seamen which may arise.

The increase of 820 American vessels entered and 838 cleared from Canal Zone ports during the present year, as compared with the year 1919—more than two each day—has created a great deal of additional work. There were 4,281 seamen shipped on American vessels and 3,278 seamen discharged, as compared with 4,182 shipped and 3,453 discharged during the preceding year. There were 624 American seamen lodged or subsisted in the Canal Zone during the year. Of this number, 288 were returned to the United States at the expense of the appropriation for the relief of destitute American seamen, and the remaining 336 were signed on vessels as seamen or workaways and returned to the United States without expense to the Government.

During the year the total amount of wages earned by seamen who were discharged at Canal Zone ports amounted to \$378,460.35; the amount approved for deduction on account of advances, allotments, fines, slop chest account, etc., was \$106,781.66, and \$271,678.69 was either paid to seamen under the supervision of the deputy shipping commissioners or received on deposit for the seamen by the deputy shipping commissioners. The wages and effects of 13 American

seamen who died in Canal Zone hospitals were handled during the year and remitted to the proper courts in the United States.

Until July 1, 1919, this work was performed by customs inspectors in the bureau of customs. Due to the increase in the work and the lack of customs force to perform it, the bureau of the shipping commissioner was created by the Governor, effective on the above date, in accordance with section 9 of the Executive order of January 27, 1914, which reads as follows:

9. The duties herein prescribed for the foregoing departments, offices, and agencies will be assigned to divisions or bureaus thereunder by the Governor of The Panama Canal, as the necessities therefor arise. Each of the foregoing departments shall discharge such further duties as may be assigned to it from time to time by the Governor; and the Governor, with the approval of the President, may transfer from time to time specific duties from one department to another.

This bureau has an authorized personnel of 14 men, who are designated as deputy shipping commissioners and boarding officers.

ADMINISTRATION OF ESTATES.

During the year 258 estates of deceased and insane employees of The Panama Canal and the Panama Railroad Company were administered, as compared with 161 estates during 1919, and there were 26 estates in course of settlement on June 30, 1920.

Of the 258 estates settled during the year 148 were delivered to the consular or diplomatic representatives in the Republic of Panama or the United States of the countries of which the deceased or insane persons were citizens or subjects; 55 estates were settled direct with heirs, upon satisfactory evidence of heirship being furnished; 7 estates were settled with guardians of heirs; 3 estates were settled with administrators; 5 estates were delivered to insane employees who recovered their sanity; 4 estates were delivered to dependent relatives of insane persons for their maintenance and support; and the net proceeds of 36 estates were used to settle claims against them. No estates were escheated during the fiscal year, but a petition for the escheat of one estate was pending in the district court on June 30, 1920.

The amount involved in the settlement of the 258 estates was \$16,314.77, of which \$15,446.87 belonged to decedents' estates and \$867.90 to the estates of insane persons.

In addition to the 26 estates remaining unsettled on June 30, 1920, 12 additional cases were being investigated in which no money or property had yet been received.

There is attached hereto a statement showing the number of estates received and settled during each month of the year, including the amount of funds handled, together with a statement giving the number, by nationalities, of the estates of deceased and insane employees settled during the fiscal year.

Paragraph 571 of the tariff act of October 3, 1913, on imports into the United States, provides for the free entry of "personal effects, not merchandise, of citizens of the United States dying in foreign countries." As a result of correspondence during the year with the United States Treasury Department regarding shipments of personal effects of deceased American employees from the Canal Zone to the United States, the collectors of customs at New York and New Orleans have been instructed by that department that such effects

may be passed without examination, free of customs duty, provided they are accompanied by a certificate signed by the Canal Zone officer who supervises the packing of the effects to the effect that the packages were packed under his personal supervision and contain nothing but personal articles which were the property of the deceased employee, and that the decedent, at the time of his death, was a citizen of the United States.

LICENSES AND PERMITS.

Motor vehicle and bicycle licenses were issued by the division of civil affairs, as well as permits for hunting and the keeping and carrying of firearms and the peddling of foodstuffs. During the fiscal year there were 3,898 such licenses and permits issued, of which 1,780 were for motor vehicles, 792 for bicycles, 723 for hunting and the keeping or carrying of firearms, and 603 for the peddling of foodstuffs. Agreements are in force with the municipalities of Panama and Colon providing for reduced reciprocal license fees on motor vehicles. The sum of \$10,748.05 was collected by this office during the past year for license fees, as compared with \$7,681.94 in the previous year.

The duty of issuing permits for hunting and the keeping and carrying of firearms was transferred to the police and fire division effective July 1, 1920.

INSURANCE COMPANIES AND CORPORATIONS.

Correspondence with insurance companies licensed to do business in the Canal Zone is handled by this office for the executive secretary, and the annual report of insurance business transacted in the Canal Zone during the calendar year is made up by this office. The seven insurance companies which were licensed to transact business during the previous fiscal year renewed their licenses during the fiscal year 1920. One other company, which was formerly licensed to do business in the Canal Zone and which still has insurance in force here, is required to keep securities on deposit and to pay the insurance tax of $1\frac{1}{2}$ per cent on the gross premium receipts collected by it in the Canal Zone. There is attached hereto a statement giving a summary of the insurance business transacted in the Canal Zone during the calendar year 1919, taken from sworn statements contained in the annual reports of the companies licensed to do business here.

The division of civil affairs handles for the executive secretary correspondence relating to foreign corporations which do business or desire to do business in the Canal Zone, under the provisions of the Executive order of March 20, 1913. The one corporation which was authorized to do business in the Canal Zone July 1, 1919, renewed its license during the year. Two other corporations were licensed to do business during the year.

Respectfully,

C. H. CALHOUN,
Chief, Division of Civil Affairs.

C. A. McILVAINE,
*Executive Secretary,
The Panama Canal, Balboa Heights, Canal Zone.*

TABLE NO. 1.—*Vessels entered and cleared, seamen shipped and discharged, and seamen lodged, subsisted, and repatriated, fiscal year 1920.*

	Vessels entered.			Vessels cleared.			Seamen shipped.		
	Bal-boa.	Cris-tobal.	Total.	Bal-boa.	Cris-tobal.	Total.	Bal-boa.	Cris-tobal.	Total.
1919.									
July.....	227	244	471	224	250	474	111	239	350
August.....	228	244	472	231	237	468	106	277	383
September.....	192	214	406	186	211	397	63	138	201
October.....	215	241	456	220	239	459	177	129	306
November.....	200	233	433	195	230	425	112	211	323
December.....	282	323	605	285	322	607	152	253	405
1920.									
January.....	273	316	589	269	310	579	132	311	443
February.....	245	295	540	245	286	531	91	323	414
March.....	260	282	542	262	292	554	120	230	350
April.....	242	278	520	242	285	527	176	170	346
May.....	250	269	519	252	273	525	84	312	396
June.....	219	251	470	220	250	470	147	217	364
Total.....	2,833	3,190	6,023	2,831	3,185	6,016	1,471	2,810	4,281
	Seamen discharged.			Seamen lodged, sub-sisted, and repatriated.			Seamen repatriated at expense of United States.		
	Bal-boa.	Cris-tobal.	Total.	Bal-boa.	Cris-tobal.	Total.	Bal-boa.	Cris-tobal.	Total.
1919.									
July.....	24	186	210	25	25	50	11	11	22
August.....	60	169	229	30	30	60	9	9	18
September.....	51	88	139	27	27	54	5	5	10
October.....	143	96	239	15	30	45	14	14	28
November.....	93	141	234	26	13	39	2	12	14
December.....	132	230	362	13	16	29	1	13	14
1920.									
January.....	93	260	353	31	52	83	13	48	61
February.....	36	201	237	29	39	68	2	23	25
March.....	241	115	356	51	43	94	1	36	37
April.....	69	201	270	21	46	67	7	29	36
May.....	129	295	424	14	37	51	3	36	39
June.....	77	148	225	20	46	66	1	22	23
Total.....	1,148	2,130	3,278	220	404	624	30	258	288

TABLE NO. 2.—*Number of estates of deceased and insane employees, by nationalities, settled by administrator of estates during fiscal year ended June 30, 1920.*

Native of—	Deceased.	Insane.	Total.
Chile.....	.....	1	1
Colombia.....	13	.....	13
Costa Rica.....	2	.....	2
France.....	1	.....	1
Greece.....	1	.....	1
Guatemala.....	1	.....	1
Haiti.....	3	.....	3
Nicaragua.....	2	.....	2
Panama.....	34	.....	34
Peru.....	3	.....	3
Spain.....	1	1	2
United States.....	15	2	17
Venezuela.....	1	.....	1
West Indies:			
British.....	149	8	157
Danish.....	1	.....	1
Dutch.....	.....	.....	.....
French.....	16	1	17
Total.....	245	13	258

TABLE NO. 3.—*Number of estates received and settled, and amount of funds handled, during fiscal year ended June 30, 1920.*

Month.	Number received.	Number settled.	Amount of funds collected.	Value of estates settled.
Balance of unsettled estates on hand on July 1, 1919, and amount collected in same.....	62	.....	\$8,758.27	.....
1919.				
July.....	7	.....	873.99	.....
August.....	21	55	664.44	\$4,362.78
September.....	7	10	1,346.05	952.84
October.....	12	19	2,388.78	1,845.71
November.....	13	15	721.70	1,736.88
December.....	21	14	819.15	1,562.70
1920.				
January.....	9	19	479.17	1,018.49
February.....	19	19	208.98	1,464.63
March.....	18	15	649.82	581.74
April.....	34	30	2,426.50	1,349.10
May.....	43	47	1,274.54	1,120.83
June.....	19	15	527.79	319.07
Total estates and cash handled.....	285	258	21,139.18	16,314.77

Number of unsettled estates on hand June 30, 1920.....26
Amount collected in unsettled estates on hand June 30, 1920.....\$4,824.41

TABLE NO. 4.—*Number of mail parcels released free of duty, number on which duty has been paid to the Government of Panama, and the amount of duty as shown by receipts on file, by offices, during the fiscal year ended June 30, 1920.*

Name of post office.	Number admitted free of duty.	Number on which duty was paid.	Amount of duty.
Ancon.....	2,525	7,996	\$18,073.23
Balboa.....	4,164	321	534.83
Balboa Heights.....	1,872	14	63.42
Corozal.....	614	25	111.02
Coco Solo.....	58	.....	.....
Cristobal.....	4,491	5,816	14,463.53
Culebra.....	260	36	16.85
Empire.....	115	.....	.....
Fort Amador.....	368	4	45.00
Fort Randolph.....	81	.....	.....
Fort Sherman.....	124	.....	.....
Gamboa.....	61	.....	.....
Gatun.....	857	47	120.78
Monte Lirio.....	.....	.....	.....
Paraiso.....	24	24	14.72
Pedro Miguel.....	612	19	8.62
Total.....	16,226	14,302	33,452.00

TABLE NO. 5.—*Number of insured and C. O. D. parcel-post parcels and registered articles delivered, by offices, during fiscal year ended June 30, 1920.*

Name of post office.	Number of insured and C. O. D. parcels.	Number of registered articles.	Total.
Ancon.....	5,352	16,757	22,109
Balboa.....	2,587	8,836	11,423
Balboa Heights.....	3,145	19,498	22,643
Corozal.....	821	3,399	4,220
Coco Solo.....	740	1,575	2,315
Cristobal.....	5,977	32,647	38,624
Culebra.....	383	1,461	1,847
Empire.....	.....	1,320	1,320
Fort Amador.....	730	1,268	1,998
Fort Randolph.....	189	349	538
Fort Sherman.....	285	429	714
Gamboa.....	.....	2,431	2,431
Gatun.....	1,034	6,424	7,458
Monte Lirio.....	.....	.....	.....
Paraiso.....	145	2,007	2,152
Pedro Miguel.....	1,139	6,324	7,463
Total.....	22,527	104,728	127,255

TABLE NO. 6.—*Letters and parcels registered and insured, by offices, during the fiscal year ended June 30, 1920.*

Name of post office.	Domestic letters registered.	Domestic parcels registered.	Foreign letters registered.	Foreign parcels registered.	Official registered free.	Insured and C. O. D.	Total.
Ancon.....	7,291	1,312	7,595	2,375	4,458	531	23,562
Balboa.....	3,734	248	1,473	80	3,779	758	10,072
Balboa Heights.....	1,796	124	194	22	48,836	224	51,196
Corozal.....	958	606	182	40	613	23	2,422
Coco Solo.....	1,560	50	15		300	189	2,114
Cristobal.....	9,819	1,124	14,770	2,224	11,984	600	40,521
Culebra.....	566	14	145		885	334	1,944
Empire.....	200	50	24		100		374
Fort Amador.....	424	11	98	7	178	297	1,015
Fort Randolph.....	113	56	1		76	51	297
Fort Sherman.....	187	8	21		70	231	517
Gamboa.....	275		195		1,137	2	1,709
Gatun.....	921	192	176	38	3,622	49	4,998
Monte Lirio.....	12		31		31		74
Paraiso.....	115		234	3	1,182	13	1,547
Pedro Miguel.....	808	13	488	15	2,740	197	4,261
Total.....	28,779	3,808	25,642	4,804	79,991	3,499	146,523

TABLE NO. 7.—*Number and amount of money orders issued, and amount of money on deposit at post offices, by offices, as reported by postmasters, for fiscal year ended June 30, 1920.*

Name of post office.	Number of orders.	Amount.	Fees.	Amount of unpaid money orders June 30.	
				Deposit.	Fee paid.
Ancon.....	27,555	\$614,616.44	\$2,113.11	\$105,230.00	\$115.50
Balboa.....	25,064	\$31,370.59	2,115.63	165,785.00	165.60
Balboa Heights.....	9,987	262,288.73	888.88	39,380.00	
Corozal.....	2,984	79,531.40	201.80	7,005.00	
Coco Solo.....	1,629	44,604.28	164.92	2,410.00	
Cristobal.....	37,140	\$62,211.02	3,212.44	111,800.00	9,025.60
Culebra.....	2,590	55,178.58	172.50	7,300.00	61.60
Empire.....					
Fort Amador.....	1,541	50,710.95	107.01	6,035.00	
Fort Randolph.....	398	10,604.60	29.18	205.00	
Fort Sherman.....	623	21,392.42	48.04	2,505.00	
Gamboa.....					
Gatun.....	7,368	164,784.30	510.50	31,530.00	310.66
Monte Lirio.....					
Paraiso.....	1,598	21,811.39	84.42	4,575.00	
Pedro Miguel.....	7,187	179,746.14	541.38	30,830.00	12.00
Total.....	² 125,664	³ 3,198,850.84	⁴ 10,192.81	⁵ 514,620.00	9,688.56

¹ Not money order office.² Figures taken from advices by postmasters and include spoiled and canceled orders. Auditor's records show 125,123.³ Figures taken from advices by postmasters. Auditor's records show \$3,199,996.98.⁴ Figures taken from advices by postmasters. Auditor's records show \$10,207.59.⁵ Figures taken from advices by postmasters. Auditor's records show \$520,070.

TABLE NO. 8.—Receipts.

	1919	1920
Interest on deposit money order funds.....	\$25,746.20	\$22,141.38
Sales of postage stamps and other stamped paper.....	81,343.78	87,096.72
Second-class mail.....	2,553.88	1,782.53
Money-order fees.....	10,426.16	10,207.59
Panama Railroad mail.....	1,200.00	1,200.00
Handling mail between Panama and Colon for Republic of Panama.....	600.00	1,675.00
Handling of United States transit mail and credit from other departments of the Government.....	4,175.93	4,760.19
Box rents.....	8,268.20	8,776.55
Miscellaneous receipts ²	2,313.25	751.64
	136,627.42	138,391.60

¹ Also includes payments from the Republic of Panama for the handling of mail for South and Central America at the Balboa exchange post office.

² Includes credits from other Departments of the Government.

TABLE NO. 9.—Summary of insurance business transacted in the Canal Zone during the calendar year 1919.

LIFE INSURANCE COMPANIES.

	Number.	Amount.
Policies in force Dec. 31, 1918.....	488	\$372,251.00
Policies issued during 1919.....	225	808,443.00
Policies lapsed during 1919.....	54	105,649.00
Policies in force Dec. 31, 1919.....	659	1,375,045.00
Losses and claims incurred during 1919.....	1	1,000.00
Losses and claims settled during 1919.....	2	3,000.00
Losses and claims unpaid Dec. 31, 1919.....	1	1,000.00
Premiums collected by life insurance companies during 1919.....		50,449.95

MISCELLANEOUS INSURANCE COMPANIES.

	Premiums received in 1919.	Losses paid in 1919.
Accident.....	\$12,171.86	\$2,721.92
Auto and teams property damage.....	¹ 28.27	
Burglary and theft.....	¹ 102.60	
Fidelity.....	313.18	1,089.36
Health.....	918.46	325.11
Liability.....	2,567.57	379.29
Surety.....	4,503.13	
Workman's compensation.....	557.89	10.98
Total.....	20,903.22	4,526.56

¹ Return premiums.

TABLE NO. 10.—Surplus of postal receipts over expenditures if 40 per cent subsidy on stamp sales had not been paid to Republic of Panama and if postage had been paid on official matter which was carried free during fiscal year 1920.

Actual postal revenues.....	\$138,391.60	
Estimated loss in postal receipts due to official matter being carried free, based on actual count of mail for 1 month—\$5,284.66 per month for 12 months.....	63,415.92	
Total.....		\$201,807.52
Expenditures for salaries and wages.....	98,744.88	
Expenditures for other than salaries and wages less 40 per cent subsidy on stamp sales amounting to \$33,783.97.....	32,883.78	
Total.....		131,628.66
Surplus receipts over expenditures.....		70,178.86
Total.....		201,807.52

APPENDIX G.

REPORT OF THE DISTRICT ATTORNEY FOR THE CANAL ZONE.

ANCON, CANAL ZONE, *July 1, 1920.*

SIR: There is attached hereto a tabulated statement of all criminal prosecutions in the district court of the Canal Zone for the fiscal year ended June 30, 1920.

There was a total of 500 cases disposed of in the district court, with the results shown in the table.

Of the criminal cases pending at the beginning of the fiscal year 1919-20, all have been disposed of except the two charges against E. F. Bataille arising out of the failure of the Continental Banking & Trust Company, which have been referred to in previous reports at length. Warrants of extradition granted by the Governors of New Jersey and New York are still in the hands of the Department of Justice.

In addition to these 2 cases, there were 18 other cases pending at the close of the fiscal year, 13 of which had been continued by the court and 5 of which had not been set for trial.

There were four applications for writs of habeas corpus during the year, as follows:

Maxim Ford.
Ormond Donawa.
Ashton Mottley.
John Neverson.

Maxim Ford was a fugitive from justice from the State of Massachusetts and was apprehended on the Canal Zone. Upon presentation of a request for extradition by the Governor of Massachusetts and the granting of the same by the Governor of The Panama Canal, Ford sued out a writ of habeas corpus and was released on bail pending a hearing on the return of the writ. Before a hearing could be had the petitioner left the jurisdiction of the Canal Zone and has not as yet been apprehended.

The remaining three writs of habeas corpus were granted to petitioners whose deportation had been ordered by the Governor of The Panama Canal. The Donawa case was dismissed of record by agreement of the petitioner and the district attorney. No hearing has been had as yet on the other writs.

The following civil cases were disposed of during the year:

Medrano de Idiaquez v. Mauremus Petersen et al.: This was a libel in admiralty for the recovery of \$2,323.20 in gold coin which had been seized while aboard a vessel for an alleged violation of the provisions of the espionage act. It was the contention of the Government that Idiaquez was attempting to export gold coin in violation of the act. Idiaquez was tried before a jury in September, 1918, and found not guilty. A libel in admiralty was then instituted to secure the return of the property in question. After a hearing on the pleadings the court ordered the coin returned to the libellant.

Jose Fernandez v. W. B. Meares, jr.: This was a suit for damages arising out of a collision between an automobile driven by the plaintiff and a Government car driven by the defendant. Inasmuch as the defendant was engaged in the performance of

his official duties at the time of the accident, the district attorney defended the suit at the request of the Governor of The Panama Canal. Trial was had before the court without a jury and judgment for plaintiff rendered in the sum of \$125 and costs.

Jose H. Stilson v. Santiago Samudio: The plaintiff in this action instituted a suit for a foreclosure of an alleged mortgage against the defendant. A decree in foreclosure was rendered and execution was had thereon. The marshal of the Canal Zone levied upon and sold as the property of Samudio certain lands situated within the Camacho watershed which had been in the possession of the United States since 1905. Prior to the confirmation of the sale the district attorney filed a suggestion on behalf of the Government, setting forth that the lands in question were owned by the United States Government and could not be levied upon and sold as the property of the defendant. After a hearing upon the motion to confirm the sale and the suggestion of the district attorney, the court ordered the sale confirmed and the deed of the marshal to issue.

The following civil cases were pending at the close of the fiscal year:

David Osborne v. Charles Hill: This is an action for trespass, alleging false imprisonment and malicious prosecution. The defendant is a Zone police officer, and the district attorney is representing him at the request of the Governor of The Panama Canal. The issues are joined and the case is ready for trial.

Charles Hinds v. J. H. Farquharson: This is an action similar to the *Osborne v. Hill* case and is now awaiting trial.

Luis Reina v. Panama Railroad Company: This is an action by the plaintiff to establish his interest in certain real estate which the defendants contend is owned by the United States Government and has been in its possession for a number of years. The district attorney filed a suggestion on behalf of the United States setting up the ownership and possession of the United States. To this suggestion the plaintiff filed certain exceptions, which were disallowed by the court. No answer has as yet been filed to the suggestion, nor has the court ruled upon the Government's motion to dismiss the action.

John F. Mountain v. Chester Harding, Governor of The Panama Canal: The plaintiff in this suit secured from the court a temporary injunction restraining defendant from suspending plaintiff's license as a pilot in Canal Zone waters. The defendant made a return to the writ asking that the temporary injunction be dissolved. The suit is pending awaiting an answer to the return of the writ.

Louise Bennett v. Panama Railroad Company et al.: This is an action for damages in the sum of \$5,000 on account of personal injuries sustained by reason of a balcony falling at house 406 Colon Beach, occupied as Panama Railroad employees' quarters, and where plaintiff was employed as a servant. After the filing of the original complaint plaintiff petitioned the court for leave to join the chief quartermaster of The Panama Canal as a party defendant. This petition was granted by the court, and the cause is awaiting the filing of answers by the defendants.

The following admiralty cases were disposed of during the year:

Houlder, Middleton & Co. (Ltd.) v. Chester Harding, Governor of The Panama Canal: The libellant asked damages in the sum of \$55,000 for injuries alleged to have been sustained by the steamship *Lautero* during transit of the Canal on August 25, 1916. A demurrer was filed to the bill of the libellant, but before hearing was had thereon the libellant dismissed the bill on his own motion.

The following admiralty cases are pending:

Leopold Falk et al. v. Steamship Olockson and the United States Shipping Board Emergency Fleet Corporation: This is a libel by the master and crew of the tug *Gorgona* as salvors of the steamship *Olockson*. The defendant steamship is owned by the United States Shipping Board Emergency Fleet Corporation and in March, 1920, was reported as being on fire at sea. The tug *Gorgona*, owned by The Panama Canal, put to sea and assisted in bringing the *Olockson* into the port of Balboa, where the fire was extinguished. Libellants ask for reasonable salvage compensation for the assistance rendered to the defendant steamship.

Halvor Humm et al. v. the United States of America, owner of the launch *Taboquilla*: The *Taboquilla* is a launch belonging to The Panama Canal. In May, 1920, the launch was sighted at sea by the steamship *Conrad Mohr*. The engines of the launch had broken down and had not been operating for a period of several hours. The seven passengers were taken aboard the *Conrad Mohr* and the launch was towed to the port of Balboa. Reasonable salvage compensation for the assistance rendered the launch is asked by the libellants.

Criminal prosecutions, 1919-20.

	Number.	Guilty.	Not guilty.	Dismissed.	Disposed of otherwise.	Remarks.
Assault.....	2		2			
Assault and battery.....	18	11	4	2	1 demurrer sustained, dismissed.	
Assault with deadly weapon	7	2	1	1	1 bail forfeited.....	1 assault.
Assault with intent to com-	3	2			2.....	1 assault and battery.
mit rape.					1.....	Do.
Assault with intent to com-	1				1.....	Do.
mit rape on minor child.						
Assault with intent to com-	1				1.....	Do.
mit infamous crime						
against nature.						
Assault with intent to kill..	1				1 nol. pros.....	To asylum.
Automobile regulations,	29	23	4	1	1 appeal withdrawn.....	1 guilty; new trial, not guilty.
violation of.						
Automobile and coach tariff	1	1				
regulations, violation of.						
Battery.....	3	2			1 appeal withdrawn.....	
Bigamy.....	1	1				
Burglary.....	34	11	1	1	17 nol. pros.....	1 guilty; sentence suspended,
					4.....	dismissed.
Buying Government prop-	1			1		3 petit larceny; 1 disorderly
erty from a soldier.						conduct.
Carrying concealed weapon.	1	1				
Conspiracy.....	4		4			
Contempt of court.....	1			1		
Customs regulations, viola-	2	1			1 demurrer sustained, dis-	
tion of.					missed.	
Cruelty to animals.....	1	1				
Deportation, returning to	3	1		1	1 nol. pros.....	
Canal Zone.						
Disorderly conduct.....	47	23	6	10	2 demurrers sustained, dis-	
					missed.	
Disturbing the peace.....	2		1		6 appeals withdrawn.....	
Drunk and disorderly.....	1		1		1 appeal withdrawn.....	
Embezzlement.....	6		1	1	4 nol. pros.....	
Embezzlement in the State	1				1 returned to United States	
of Wyoming.						
Escaping from prison.....	4	4				
Executive Order No. 26,	1				1 demurrer sustained, dis-	
violation of.					missed.	
Exhibiting deadly weapon.	1				1 nol. pros.....	
False pretenses and cheats.	5	1			4 nol. pros.....	
Fighting.....	1		1			
Forgery.....	10	2		4	2 nol. pros.....	2 petit larceny.
Fraud.....	1			1	2.....	
Gambling.....	2	2				
Grand larceny.....	103	30	11	5	34 nol. pros.....	To asylum.
					1 nol. pros.....	17 petit larceny.
					17.....	
					2 information withdrawn..	
					3 bail forfeited.....	
Incest.....	1	1				
Infamous crime against na-	4	4				
ture.						
Intoxication.....	2	1		1		
Libel.....	2	1		1		
Liquor regulations, viola-	30	22		6		
tion of.						
Loitering.....	30	15	1		10 2 nol. pros.....	
					1 appeal withdrawn.....	
					1.....	1 guilty; sentence suspended,
						dismissed.
Lottery laws, violation of..	1	1				
Manslaughter.....	3		2	1		
Mayhem.....	2	1			1.....	1 assault and battery.
Murder.....	4	3			1.....	1 manslaughter.
Mutiny.....	4	4				
National prohibition act,	48	44	2		1 bail forfeited.....	
violation of.					1 nol. pros.....	To asylum.
Navigation laws, violation	8	6			1 nol. pros.....	
of.					1 bail forfeited.....	
Nonsupport.....	1			1		
Obtaining money under	1				1 information not filed.....	
false pretenses.						
Obstructing an officer.....	1			1		

Criminal prosecutions, 1919-20—Continued.

	Number.	Guilty.	Not guilty.	Dismissed.	Disposed of otherwise.	Remarks.
Opium act, violation of....	1	1				
Perjury.....	6		1	5	1 nol. pros.....	1 guilty; sentence suspended, dismissed.
Petit larceny.....	13	8	1	1		
Postal laws, violation of....	2			2		
Quarantine regulations, violation of.	5	5				
Rape.....	2	1			1 nol. pros.....	
Receiving stolen property..	4	3			1 bail forfeited.....	
Refusing to pay train fare for a minor.	1		1			
Revised Statutes, United States, sec. 4596, violation of.	3	2	1			
Robbery.....	9	4	2		1 nol. pros.....	2 petit larceny.
Sanitary regulations, violation of.	1	1			2.....	
Securing signature by false promises and pretenses.	1				1 information not filed.....	
Seduction.....	1				1 nol. pros.....	
Vagrancy.....	10	2	1	6		1 guilty; sentence suspended, dismissed.
				1		
Total.....	500	249	51	68	132. 73 nol. pros. (3 to asylum); 7 bail forfeited; 2 informations withdrawn; 2 informations not filed; 5 demurrers sustained, dismissed; 1 returned to United States; 32 guilty of other offenses than those charged; 10 appeals withdrawn.	

Guilty.....	249
Not guilty.....	51
Dismissed by court.....	68
Disposed of otherwise.....	132
Total.....	500

In the 51 cases not guilty, 1 case was found guilty on original trial, a new trial was given by the court, and defendant was found not guilty.

Of the 68 cases dismissed by the court, 4 were found guilty, sentence suspended by the court, and later dismissed.

Of the 72 cases not prosessed by the district attorney, 3 were sent to the insane asylum at Corozal. In a great majority of the cases nol prosessed more than one charge had been made against the defendants for the same or similar offenses, and the defendants being convicted on one charge, the district attorney entered a nol. pros in the other cases.

In 32 cases the defendants were found guilty of offenses other than those charged, as follows:

Charged.	Found guilty.
1 assault with deadly weapon.....	Assault and battery.
1 assault with deadly weapon.....	Assault.
1 assault with intent to commit rape.....	Assault and battery.
1 assault with intent to commit rape on minor child.....	Do.
1 assault with intent to commit infamous crime against nature..	Do.
3 burglary.....	Petit larceny.
1 burglary.....	Disorderly conduct.
2 forgery.....	Petit larceny.
17 grand larceny.....	Do.
1 mayhem.....	Assault and battery.
1 murder (jury).....	Manslaughter.
2 robbery.....	Petit larceny.

Demurrers to the forms of informations were sustained in five cases and the cases dismissed.

In 11 cases jury trials were demanded by the defendants, as follows:

1 false pretenses and cheats.....	1 guilty.
7 grand larceny (1 disagreed).....	4 guilty, 2 not guilty.
2 manslaughter.....	2 not guilty.
1 murder.....	1 manslaughter.

11	
Guilty.....	5
Guilty of offense other than charged.....	1
Not guilty.....	4
Disagreed.....	1
	<hr/> 11

Of the 500 cases disposed of 167 were cases on appeal from the magistrates' courts, disposed of as follows:

Guilty.....	91
Not guilty.....	22
Dismissed by court.....	34
Nol. pros.....	4
Appeals withdrawn, fines paid.....	10
Demurrers sustained, dismissed.....	3
Guilty; sentence suspended, dismissed by court.....	2
Guilty; new trial given, not guilty.....	1
Total.....	<hr/> 167

Respectfully,

A. C. HINDMAN,
District Attorney.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal, Balboa Heights, Canal Zone.

APPENDIX H.

REPORT OF THE SPECIAL ATTORNEY.

ANCON, CANAL ZONE, *August 24, 1920.*

SIR: I have the honor to submit herewith my annual report as special attorney for The Panama Canal for the fiscal year ended June 30, 1920. Following the usual practice I am including the business transacted by me as counsel for the Panama Railroad Company on the Isthmus, as well as a statement of the operations of the land office of The Panama Canal and the real estate transactions of the Panama Railroad Company.

The personnel of the special attorney's office was reduced during the fiscal year, due to the fact that the work of the joint commission terminated in the latter part of the fiscal year. The services of two land inspectors were discontinued. The organization at the present time consists of the special attorney, the assistant to the special attorney, one clerk, one draftsman on the gold roll, and one messenger on the silver roll. The assistant to the special attorney is also land agent for The Panama Canal. The special attorney is also counsel on the Isthmus for the Panama Railroad Company, and he is aided in his work by the assistant to the special attorney, whose salary is paid entirely by the Panama Railroad Company. Counsel for the railroad is provided with a clerk at the expense of the Panama Railroad Company. Counsel receives no salary from the Panama Railroad Company.

LAND MATTERS OF THE PANAMA CANAL.

A joint commission was appointed on February 28, 1913, by the President of the United States and the President of Panama, in conformity with Articles VI and XV of the Panama Canal treaty of 1903. The commission continued until March 10, 1920, when they made their final report to the two Governments, after all of the cases upon the commission's docket had been disposed of, with the exception of 16 that remained on the docket for reasons which will be stated hereafter.

A number of changes took place in the personnel of the commission between 1913 and 1920, due to deaths and resignations of members. Mr. Federico Boyd was the only member who served throughout from the beginning to the end of the commission, with the exception of a few intervals when he was absent on account of illness. Mr. George A. Connolly, one of the American members of the joint commission, resigned on January 31, 1920, and was succeeded by Mr. H. A. A. Smith, who served on the commission until its labors terminated on March 10, 1920.

A total of 3,600 claims were filed with the joint commission from the date of its organization in 1913 to the termination of its work in 1920. By agreement of the Government of the United States and the Government of Panama, the commission established a rule

to the effect that no claims could be filed with the commission after December 27, 1914, unless good cause was shown why the claim had not been filed before that date, in which event the claim could be filed not later than the 27th day of March, 1915. A few claims were filed after the latter date with the consent of the two Governments. However, the total number of claims filed was 3,600, as already stated.

All of the claims were disposed of by the commission or by the umpires, except the 16 claims already referred to. The aggregate demand made by the claimants in the above-mentioned 3,600 claims was \$21,072,235.41. Some three or four hundred of these claims were filed by the members of the commission on their own motion, on behalf of claimants, during the first six months of the existence of the commission. No docket numbers were given to these claims at the time, nor were the respective amounts claimed by the claimants stated. A considerable number of these claims were disposed of by the commission during the year 1913, without public hearing, solely upon evidence obtained by the commission itself in chambers or without the presence of counsel for the United States or the claimants. Hence it is impossible to state with accuracy the value of the claims as asserted by the claimants in these particular cases, and in default of that data, the amount of the award or the sum paid to the claimant in direct settlement has been taken as the sum demanded by the claimants. After the reorganization of the commission in 1914 the claims which had not been numbered by the commission of 1913 were given consecutive numbers upon the commission's docket, and they are included in the 3,600 claims.

It might be well to divide the claims disposed of by the commission into groups, stating also the aggregate amount of money paid by the United States, if any, for obtaining the adjustment of each respective group.

Since February, 1913, the joint commission has made awards in 844 claims; the aggregate sum demanded in these claims was \$6,116,682.97. The aggregate amount awarded by the commission for the 844 claims was \$880,534.79.

The umpires of the joint commission appointed since its organization in 1913, disposed of 40 claims by awards in which the aggregate demand was \$6,704,490.76. The amount awarded to these 40 claimants by the umpires was \$860,144.15.

The commission since February, 1913, dismissed 2,041 claims on the ground that they had been settled directly between the claimants and the agents of the United States. The aggregate demand made in the 2,041 claims was \$3,718,885.50. The aggregate amount paid by the Government in their settlement was \$764,512.71.

During the same period the joint commission defaulted 318 claims. The aggregate demand made in the 318 claims was \$974,062.28.

For the want of jurisdiction 178 claims were dismissed wherein a total of \$1,504,821.15 was demanded.

Because of a previous award having been made covering the same property the joint commission dismissed 42 claims, involving an aggregate demand of \$388,277.37.

There were 10 claims withdrawn upon the motion of claimants, and which were accordingly dismissed by the joint commission; the aggregate demand of the 10 claims was \$167,397.50.

For the want of merit the joint commission dismissed 106 claims wherein the amount demanded was \$1,374,040.38.

Five claims were found to be duplicates of prior claims and were accordingly dismissed by the joint commission. These five claims involved an aggregate demand of \$1,798.50.

It might be added that a considerable number of the 318 claims defaulted under the joint commission's rule because of the lack of prosecution were claims in which direct settlement had been made with the claimants by agents of the United States; and in a number of instances these claims were duplicates filed by a commission of Panamanians claiming to act as the representatives of the claimants under authority of the Panaman Government. This commission acted without sufficient data, and, in consequence, most of the claims which they filed related to property which had already been paid for by the United States, and the claimants were no longer interested in the matter, and in consequence made no appearance before the commission.

One of the 318 claims noted here among those defaulted is the claim of the Playa de Flor Land & Development Co., docket No. 2900, for land and improvements at Toro Point, for which damages in the sum of \$357,040 were demanded. This claim was set down for hearing on November 17, 1919, and when the case was called for trial upon that date the attorney of record for the claimants stated to the commission in public session, and also in a written document, that he refused to submit the case to the jurisdiction of the commission. The American members of the commission voted to dismiss the case at once, but the Panaman members declined to dismiss the claim. However, a rule of default was entered by the commission, unanimously, against the claimants. At the expiration of the 60-day period fixed in the rule, which was established with the consent of the two Governments, an extension was granted to February 24, 1920. This also with the consent of the two Governments. On February 24, 1920, a motion was filed by counsel for the claimants asking that the hearing be postponed until the 15th of March, 1920. The Panaman members of the commission voted to grant the motion; the American members voted to deny it. On February 26, 1920, counsel for the claimants asked that further action on the case be suspended until the umpire passed upon the issue, by reason of the fact that the members of the commission were equally divided in conclusion. The American members voted to deny this motion, while the Panaman members voted to grant the request. Upon this state of the case the American members were of opinion that the rule of default had become absolute. The Panaman members, on the other hand, contended that the disagreement should go to the umpire. I concur in the conclusion reached by the American members that the rule of default became absolute and that there was nothing to refer to the umpire.

I might add that subsequently the umpire, at the instance of the Panaman Government and without consulting the American Government, gave an informal opinion to the Panaman Government that the issue should have been referred to him and that the case was still pending. Inasmuch as the matter had not been referred to the umpire by the two Governments or by the commission, he was without jurisdiction to make the announcement.

At all events, the commission terminated its labors and made its final report and the case can not come before another commission except with the consent of the two Governments.

The 16 cases remaining undisposed of, already referred to in this report, involve claims arising under leases or contracts for occupancy of land in the Canal Zone made with the Panama Railroad Company. The Congress of the United States, by virtue of section 2 of the sundry civil appropriation act of March 3, 1915, and section 2 of the sundry civil appropriation act of July 1, 1916, declared that the joint commission was without jurisdiction to adjudicate any such claims, and that no part of the moneys appropriated by those acts or any other act could be used in the payment of such claims, or in the payment of salaries or expenses of the joint commission in adjudicating or settling any of such claims. In view of these positive Congressional mandates the American members of the commission declined to proceed to a hearing of the 16 claims.

The 16 claims just mentioned were not within the jurisdiction of the commission, in my judgment. The leases held by the claimants were canceled by the Panama Railroad Company, the lessor, in conformity with the terms of the lease. A disagreement arose as to the meaning of certain clauses of the leases with respect to the indemnification that the claimants were entitled to. Counsel for the Panama Railroad Company then suggested to the claimants that they institute suits in the Canal Zone courts to determine the issues. This they declined to do. They presented claims against the United States before the joint commission instead. They did this upon the alleged ground that the Panama Railroad Company had canceled the leases simply to clear the land for the benefit of the United States. While it may be conceded that their conclusion was correct, yet the issues were between them and the Panama Railroad Company, and any demand for damages that they might have was against the railroad and not against the United States. The agents of the Panama Railroad Company have repeatedly advised the claimants, since they filed their claims with the joint commission, that the company was willing to submit the controversy to the courts of the Canal Zone; but the claimants have refused to do this.

TABULATION OF THE AFOREMENTIONED CLAIMS.

The 3,600 claims filed before the joint commission between February, 1913, and the end of the period allowed for filing such claims, may be placed in the following classes or categories:

	Number of claims involved.	Amount claimed.	Amount paid in settlement or awarded.
Dismissed because of payment to claimants by agents of the United States.....	2,041	\$3,718,885.50	\$764,512.71
Dismissed under rules of default.....	318	974,062.28	.....
Dismissed because of lack of jurisdiction.....	178	1,504,821.15	.....
Dismissed because of previous award of the joint commission in a prior claim.....	42	388,277.37	.....
Withdrawn.....	10	167,397.50	.....
Dismissed because of lack of merit.....	106	1,374,040.38	.....
Dismissed because of being duplicates of other claims filed by the same person.....	5	1,798.50	.....
Awarded for by the joint commission.....	844	6,116,682.97	880,534.79
Awarded for by the umpire.....	40	6,704,490.76	860,144.15
Undisposed of by the joint commission and the umpire.....	16	121,779.00	.....

The various joint commissions and umpires appointed under the Panama Canal treaty prior to December 5, 1912, made 21 awards, aggregating the sum of \$304,588. There are no data available to indicate what the aggregate of these 21 claims amounted to as demanded by the claimants. We thus have a grand total of 905 claims settled and paid for under awards made by all of the joint commissions and umpires appointed under the treaty, aggregating the sum of \$2,045,266.94.

It might be well to say that the claimants in a few cases have declined to accept the moneys awarded to them by the commission. The award made by the umpire in the sum of \$102,400 in favor of the claimants in the case of Julia del Carmen Bermudez de Aleman et al., docket No. 2982, involving the Punta Paitilla property, has not been paid, inasmuch as counsel for the Government declined to certify the award for payment upon the ground that the umpire had departed from instructions to him contained in the treaty, and the matter has been submitted to the State Department for its consideration.

The statements contained in this report, with respect to claims disposed of by the commission and by direct settlement with the land office, are made after a careful examination of our records and those of the joint commission, and discrepancies between our records and those of the joint commission appear to be due to the following causes:

The fact that the commission early in 1913 entered up so many claims upon their own motion without stating the amount demanded by the claimants. A number of claims were dismissed in part, an award made to the claimants in part, and again only a part of the claim was referred to the umpire under disagreement. The claimants in several cases were allowed to amend their claims verbally, during the trial, by increasing the amount demanded. In other cases awards were made for the improvements only, and later other awards were made in the same cases for the land claimed, and this together with awards to other claimants, the cases having been consolidated.

While there may be some inaccuracies in the statements made in this report, everything has been done that is possible to reach correct conclusions, and it is believed that the discrepancies between the records of this office and those of the joint commission have been substantially adjusted in this report.

LAND CLAIMS DISPOSED OF DURING THE FISCAL YEAR.

Forty-five land and improvement claims were settled by the land office during the fiscal year 1919-1920, aggregating the sum of \$33,238.96.

A total of 4,537 land and improvement claims were settled and paid for by the land office since the work of the clearing of the Canal Zone commenced under the President's depopulation order of December 5, 1912, aggregating the sum of \$1,154,475.56. These settlements were made direct by the land office with the various claimants, and no awards made by the joint commission or the umpires are included in the foregoing statement.

The law department of The Panama Canal was authorized to settle land claims on August 6, 1908, by virtue of an Executive order of the President. Since that date the law department, and afterwards the office of the special attorney, under authority of the act of Congress of April 7, 1914, have settled directly with the claimants 5,599 claims for damages to land and improvements taken over by the Government for Canal and railroad purposes. The amounts paid in settlement of all of these claims aggregated the sum of \$1,403,378.86, including the sum of \$764,512.71 paid by way of direct settlement of 2,041 claims filed by the claimants with the joint commission and which claims were afterwards dismissed by the commission because of such direct settlements with the Government.

Some settlements for improvements destroyed were made by the Canal and railroad organizations prior to August 6, 1908. But inasmuch as these transactions were not handled by the law department, which was not created until August 6, 1908, there are no data available in this office with respect to such settlements. I might say, however, that they do not involve any very large sum of money.

The total amount paid for land and improvement claims under awards of all of the commissions and umpires appointed under the Canal treaty (the first commission having been appointed in 1905) as well as payments made under direct settlements made with the claimants since August 6, 1908, the date on which the law department was created, aggregated a grand total of \$3,448,645.80.

At the commencement of the fiscal year there were pending before the joint commission 94 claims, involving an aggregate demand of \$2,466,869.81. There were pending before the umpire 13 claims, wherein the aggregate demand amounted to \$3,695,796.56. There were no new claims filed during the fiscal year.

During the year the joint commission certified to the umpire for his decision 7 claims, wherein the total amount demanded was \$683,516.67. He disposed of a total of 20 claims during the fiscal year, wherein an aggregate demand was made of \$4,379,313.23. Thirteen of these claims were certified to him during the year 1918-19. Of these 20 claims, 17 were disposed of by the umpire through 17 awards, aggregating the sum of \$495,776.70. The aggregate amount claimed in these 17 claims was \$4,125,713.23. The umpire dismissed 3 claims. Two of these claims were for the aggregate sum of \$103,600, and went off for the want of merit. The other claim, entitled Quebrada de Oro Plantation & Mining Co., docket No. 3003, was dismissed by the umpire without prejudice to the right of the claimant to file its claim before a competent tribunal. The amount demanded in this claim was \$150,000. We take this dismissal to mean a final disposition of the claim in so far as the Government of the United States is concerned. We are also of the opinion that the claim is without merit. The claimant, however, is making efforts to have the claim resubmitted to another commission.

During the fiscal year the joint commission disposed of 71 claims, wherein the aggregate demand was \$1,304,534.14, and in detail are as follows:

Seven of the claims, involving an aggregate demand of \$69,263.64, were disposed of by nine awards, the aggregate amount awarded

being \$19,074.91. One claim, wherein \$50,000 was demanded, was dismissed on claimant's motion. Seventeen claims, wherein an aggregate sum of \$72,056.35 was demanded, were dismissed by the commission because of lack of jurisdiction. Twenty-two claims, asking for \$326,893.65, were dismissed by the commission on evidence being presented that the claimants had made direct settlements with the agents of the United States. Five claims, asking for \$302,582, were dismissed on account of previous awards having been made for the same property. Nine claims, wherein \$215,764.50 were demanded, were dismissed by the commission because of lack of merit. Ten claims, wherein the aggregate demand made was for \$625,014, were dismissed under the commission's rule of default on account of failure to prosecute on the part of the claimants.

There still remain undisposed of 16 claims, being claims based upon Panama Railroad Company leases already referred to in this report. The aggregate amount demanded in the 16 claims is the sum of \$121,779.

It might be well to refer again to the claim of the Playa de Flor Land & Development Co., involving a demand for \$357,040, which we contend went off by default and which the claimants say is still pending, and their contention is supported by the Panaman members of the joint commission and by the unauthorized ruling of the umpire.

PANAMA CANAL LAND LICENSES.

On June 30, 1920, there were 58 lot licenses in effect in the Canal Zone, which had been issued by the land agent on behalf of The Panama Canal. Of this number seven licenses were issued during the fiscal year 1919-20. The licenses were granted to various parties to erect oil tanks, steamship office buildings, cable offices, lodge halls, and residences for the employees of steamship companies, oil companies, and the cable company. The licenses also included lots for churches. The revenue collected on these licenses for the fiscal year 1919-20 aggregated the sum of \$16,290.02. No rental, however, was collected on lots occupied by churches and used for religious purposes.

PANAMA RAILROAD LAND MATTERS.

The land agent of The Panama Canal acts as land agent for the Panama Railroad Company under a contract between The Panama Canal and the Panama Railroad Company by the terms of which the latter pays to the former the sum of \$9,000 per annum for such service.

PANAMA RAILROAD LEASES AND LICENSES REPORTED BY THE LAND AGENT.

I am submitting herewith a statement of leases and licenses from the Panama Railroad Company to various parties in effect July 1, 1920, as shown by the land office records:

Statement of Panama Railroad leases and licenses in effect July 1, 1920.

Location.	Leases.		Lots.		Rental.	
	July 1, 1919.	July 1, 1920.	July 1, 1919.	July 1, 1920.	July 1, 1919.	July 1, 1920.
Colon.....	823	853	830	873	\$82,282.28	\$96,309.40
Folks River, R. P.....	52	52	54	54	2,926.40	2,926.40
Stable lots, Colon.....	8	.....	11	.....	534.00	.....
Las Esplanadas.....	103	103	122	122	3,987.00	3,987.00
Guachapali.....	153	153	194	194	8,378.93	8,378.93
Santa Cruz.....	89	89	107½	107	4,001.28	4,001.28
Panama Yard including English wharf and bulkhead.....	17	18	29½	30	5,368.00	5,392.00
Juan Ponce.....	1	1	1	1	60.00	60.00
Total for leases.....	1,246	1,269	1,349	1,386	107,537.89	121,055.01

Location.	Licenses and permissions.		Lots.		Rental.	
	July 1, 1919.	July 1, 1920.	July 1, 1919.	July 1, 1920.	July 1, 1919.	July 1, 1920.
Miscellaneous (Colon).....	3	3	.....	.....	\$114.00	\$114.00
Buildings, rooms, and stores, Colon-Cristobal.....	24	25	.....	.....	21,180.00	21,302.04
Cristobal.....	6	.....	8	.....	1,505.52	(1)
News agency.....	1	1	.....	.....	1,560.00	480.00
Huerta Sandoval.....	2	.....	2	.....	360.00	.....
Miscellaneous (Panama).....	1	1	.....	.....	1.00	1.00
Javillo fill.....	2	3	2	3	120.00	168.00
Room in Panama R. R. station, Balboa Heights.....	1	1	.....	.....	120.00	120.00
Panama R. R. Building, Huerta Sandoval tract.....	.....	1	.....	.....	.....	900.00
Total for licenses and permissions.....	40	35	13	4	24,960.52	23,085.04
Grand total for all leases, licenses, and permissions.....	1,286	1,304	1,362	1,390	132,498.41	144,140.05

¹ This item covers steamship-lot sites in Cristobal, and is no longer collected by the Panama Railroad Company, having been turned over to The Panama Canal accounts during the fiscal year just past.

The foregoing statement relates to lots leased by the railroad company in the cities of Panama and Colon.

A decided increase is shown in the amount of approximated land-rental bills to be issued during the next fiscal year, for the city of Colon, as compared with the approximate land-rental bills issued during the fiscal year 1918-19, which can be accounted for by the fact that during the year just ended 15 lots were leased in the newly created warehouse district at an annual rental of \$4,543.52. In addition, 38 lots were leased in the newly created white residential district at an annual rental of \$8,810.

The licenses for all the stable lots located on the south side of Ninth Street, between G and I Streets, Colon, were canceled during the year by the direction of the health officer of Colon-Cristobal. The major portion of the new concrete stables being built by the Panama Railroad Company have been completed, and all draft and coach animals of Colon and all wagons, carts, and coaches are now being stabled and accommodated in the new buildings. These stables are located south of Sixteenth Street, between Reyes Alley and G Street.

A slight increase is shown in this report in the amount of approximated rentals on buildings, rooms, and stores, Colon and Cristobal, accounted for by the reason that two new storerooms were created

out of two alleyways in the Panama Railroad Company's concrete building, Colon, located on Eleventh, Front, and Bottle Alley, and have been leased at an annual rental of \$540, and the rental rate of one storeroom in the same building was increased \$62.04 per annum; offsetting these increases we must deduct the sum of \$480 per annum on account of the fact that the lease issued to one lessee for the joint occupancy of room 7-A, Masonic Temple, Cristobal, with the land agent, has been canceled, the lessee having secured the lease to a larger office room in the same building. At the present time room 7-A is occupied only by the land agent.

A warehouse district (bonded or unbonded) was opened up during the year, the district comprising 21 lots located in block 54, Colon, situate between Reyes Alley, G, Fifteenth, and Sixteenth Streets. The district is divided into three tiers of 7 lots each, and 14 of the 21 lots have a frontage upon a street through which a spur track has been run to accommodate the handling of freight into and out of the warehouse, the spur running north and south between two of the tiers and joins the Broadway track. Fifteen of the 21 lots were leased during the year, and there are now before us several inquiries relating to the lease rights in the remaining 6 lots.

A residential district, restricted to the use of persons of the Caucasian race only, was opened up during the year, the district consisting of blocks 20, 21, 26, and 27, a total of 99 lots. This district is bounded on the north by Seventh Street, on the east by K Street, on the south by Ninth Street, and on the west by G Street. During the year 38 of the lots were leased. There are applications before us now for the lease rights in several of the remaining lots.

During the fiscal year the Panama Railroad Company purchased a two-story wooden building from Mr. Joseph D. Williams, which building is located on the Huerta Sandoval tract in the city of Panama, owned by the United States and held under license by the Panama Railroad Company, for the sum of \$5,000. The building division of The Panama Canal renovated the building into a tenement-type house at a cost of \$5,850.39. We have leased the building under temporary permission for the sum of \$75 per month, which price includes light and water.

The total of leases, licenses, and permissions issued by the Panama Railroad Company on lots in the cities of Panama, Colon, and Cristobal in effect on July 1, 1920, was 1,304, covering 1,390 lots, and for which bills were issued in the amount of \$144,140.05, during the fiscal year 1919-20, as shown by the records of the land office, which figures are \$11,641.64 more than those shown for the corresponding item in the report for the fiscal year 1918-19.

The total amount of money actually collected on account of the items covered in the preceding paragraph during the fiscal year just ended, as indicated by figures submitted to this office by the auditor, is \$135,996.46, and which represents an increase of \$3,643.77 over the actual collections on account of the same items for the year 1918-19; that is to say, \$8,143.59 less than the aggregate amount of the bills rendered. All of this, or practically all of it, has been paid since the end of the fiscal year.

Thirty-three new leases were issued during the fiscal year 1919-20, covering 55 lots, all in the city of Colon.

No fires which affected property situated on Panama Railroad Company lots, of sufficient importance to warrant any mention here occurred during the fiscal year.

On June 26, 1920, the Board of Directors of the Panama Railroad Company authorized the land agent to grant extensions, beyond the usual five-year period upon the expiration of the present leases on lots upon which wooden buildings have been erected, at the best rental rates then obtainable. According to the authority granted when a lease is about to expire a representative of the building division will inspect the building situate upon the lot, and if the building division's representative finds that the condition of the building warrants it, an extension of 5, 10, or 15 years (depending upon the condition of the building) will be granted by the Panama Railroad Company.

During the fiscal year the fill between Third and Ninth, G and K Streets was completed and, as already stated in this report, the occupancy of the area between Seventh and Ninth, G and K Streets, has been restricted to members of the Caucasian race. An additional fill is now being made along the south side of Ninth Street, between Broadway and K Streets.

Municipal work in block 53 has started. This block is located directly north of block 54, the area laid aside during the year for warehouse sites.

PANAMA RAILROAD LITIGATION.

The litigation against the Panama Railroad Company in the Canal Zone has increased to a considerable degree, due largely to the action of the courts in holding that resort may be had to principles of the common law in the interpretation of the statutes of Colombian and Panaman origin. Also due largely to the wreck of the passenger train which occurred near Gamboa on May 20, 1918, in which some of the second-class coaches of the company were demolished and some passengers killed and a considerable number injured.

As a result of the Gamboa wreck a large number of claims for damages because of alleged personal injuries and loss of personal property were presented against the railroad company. The greater number of claims presented were adjusted by the claim officer. Seventeen suits were filed for alleged personal injuries and loss of property occasioned by the wreck. The claims for damages in these suits aggregate the sum of \$187,043.60. Fifteen of these suits, involving an aggregate demand of \$165,323, have been disposed of either by judgment or compromise settlement. The aggregate amount of such settlements and judgments was \$18,275. Two of the 17 suits remained pending in the Canal Zone courts at the end of the fiscal year and they represent an aggregate demand of \$21,720.60.

The 15 claims above referred to as having been either amicably settled or adjudicated in the Canal Zone courts include the cases of *Camila Castilla v. Panama Railroad Company* and *James Rock v. Panama Railroad Company*, in which judgments for \$1,500 and \$3,000, respectively, were rendered against the railroad company. Both of these cases are now pending in the United States Circuit Court of Appeals for the Fifth Circuit, at New Orleans, on writ of error sued out by the railroad company.

The following Panama Railroad cases were pending at the end of the fiscal year:

DISTRICT COURT, CRISTOBAL DIVISION.

Louis Anderson v. Panama Railroad Company, civil docket No. 319. This is a case wherein suit is brought for damages in the amount of \$2,500 on account of personal injuries alleged to have been received by the plaintiff while in the employ of the company at its cold-storage plant at Mount Hope, Canal Zone, which injuries involved the loss of a finger on the right hand. Appearance for the defendant has been duly entered in the case and a motion on the latter's behalf requiring plaintiff to file security for costs is now pending in said suit.

John A. Brown, administrator of the estate of Adolphus Brown, deceased, v. Panama Railroad Company, civil docket No. 231. This is a suit for damages in the amount of \$10,000 on account of the death of plaintiff's decedent which occurred through the negligence as alleged of the defendant company while the deceased was in its employ in the cold-storage plant at Cristobal. The defendant has filed a demurrer to the plaintiff's complaint and also a motion to require the plaintiff to give security for costs.

Louis Bennett v. Panama Railroad Company, civil docket No. 240. This is a suit for damages in the sum of \$15,000, based upon the alleged personal injuries of a minor nature sustained by plaintiff resulting from the collapse of a defective veranda of one of the houses used as employees' quarters by The Panama Canal, in which building the plaintiff was employed as a house servant by the employee who occupied it. Since the filing of the suit the plaintiff has joined the chief quartermaster, Panama Canal, as party defendant. The defendant has entered its appearance and has filed a motion asking that the plaintiff be required to give security for costs.

This case will doubtless be dismissed as there is no responsibility of the Panama Railroad involved. The house in question is under the control and jurisdiction of The Panama Canal.

Messrs. Albert and Jacob David Cohen, a copartnership doing business under the firm name and style of Cohen Brothers, plaintiffs, *v. The United Fruit Co.* This is an action for conversion and damages involving the loss of 16 cases of shoes. The Panama Railroad Company has been made a party defendant.

Alsace Carrina v. Panama Railroad Company, civil docket No. 268. This is an action for damages in the amount of \$5,000, based on alleged slanderous statements made of the plaintiff, who was employed on the Cristobal docks of the company, by an agent and servant of the defendant. A demurrer was filed by the defendant to the plaintiff's complaint on July 31, 1919, which demurrer was argued by counsel for both parties in the case very soon thereafter, and was taken under advisement by the court. No decision had been reached at the end of the fiscal year.

Joseph Jordan v. Panama Railroad Company, civil docket No. 317. This is a suit for damages in the amount of \$5,000 arising out of alleged personal injuries and damages to a coach sustained by plaintiff at the 11th street crossing in Colon. The company has duly appeared in the case and filed a motion requiring the plaintiff to give security for costs.

Joseph Liscomb v. Panama Railroad Company, civil docket No. 226. This is a suit for damages in the sum of \$5,500, based on the alleged fact that plaintiff was denied passage on one of the railroad steamers after purchasing a ticket entitling him to such passage. The defendant appeared in the case and filed pleas to the jurisdiction of the court, and also a motion requiring the plaintiff to give security for costs.

Adolphus Lodge, a minor, by his guardian ad litem, *V. G. de Suze, v. Panama Railroad Company*, civil docket No. 136. This is a suit for damages in the amount of \$10,000 for injuries alleged to have been sustained by plaintiff because of being run into by one of defendant's engines in Cristobal. Appearance was entered by the defendant and a motion on its behalf was filed to require the plaintiff to give security for costs.

P. W. Murray v. Panama Railroad Company, civil docket No. 315. This is a suit for damages in the amount of \$677.60 arising out of the alleged loss of and damage to certain household goods which were being carried on defendant's steamship *Elizabeth*. Appearance was entered on behalf of the defendant as well as a motion requiring the plaintiff to give security for costs.

Hyman Magnus, a minor, by his guardian ad litem, *Josephine Gray, v. Panama Railroad Company*, civil docket No. 263. This is a suit which involves a claim of \$50,000, based on the alleged personal injuries sustained by the minor through being run down by one of defendant's commissary delivery trucks. The defendant has filed an answer in the case as well as a motion requiring the plaintiff to give security for costs.

Warren E. Minnix *v.* Panama Railroad Company, civil docket No. 327. This is a suit for damages in the sum of \$7,500 arising out of alleged injuries sustained by the plaintiff in the course of his employment at the defendant's coaling plant at Cristobal. Appearance on behalf of the defendant has been entered.

Frederick Olivierre *v.* Panama Railroad Company, civil docket No. 302. This is a suit for damages in the amount of \$2,500 arising out of alleged personal injuries sustained by the plaintiff while employed as a stevedore on defendant's docks in Cristobal. Defendant has filed a demurrer to plaintiff's complaint and also a motion to require the plaintiff to give security for costs.

Panama Railroad Company *v.* United Fruit Co., civil docket No. 278. This is a suit for damages in the amount of \$314.21, the value of certain cold-storage supplies which it is alleged were mishandled by the defendant company on one of its steamers, and as a result were totally lost to the plaintiff. The suit is now pending upon complaint and answer.

John Richard *v.* Panama Railroad Company, civil docket No. 296. This is a suit for damages in the amount of \$2,000, based upon the alleged personal injuries sustained by the plaintiff while in the employ of the defendant on the docks at Cristobal. The defendant has filed a demurrer to plaintiff's complaint and also a motion to require the plaintiff to give security for costs.

Catherine Rice, administratrix of the estate of Jonathan Rice, deceased, *v.* Panama Railroad Company, civil docket No. 252. This is a suit for damages in the amount of \$25,000 arising out of alleged injuries resulting in the death of Jonathan Rice, while in the employ of the defendant at its coaling plant in Cristobal. The defendant company has filed a demurrer to plaintiff's complaint and also a motion to require the plaintiff to give security for costs.

George Scott *v.* Panama Railroad Company, civil docket No. 238. This is a suit for damages in the amount of \$7,500, based upon alleged personal injuries sustained by the plaintiff, consisting of the loss of one finger, while in the employ of The Panama Canal on defendant's docks in Cristobal. Demurrer has been filed by the defendant to the plaintiff's complaint and also a motion to require the plaintiff to give security for costs.

Alexander White *v.* Panama Railroad Company, civil docket No. 262. This is a suit for damages in the amount of \$12,500 arising out of alleged injuries sustained by the plaintiff while on defendant's right of way along the Margarita spur of the railroad. The defendant has filed an answer to the complaint and also a motion to require the plaintiff to give security for costs.

Alpheus Williams, administrator of the estate of Samuel Augustus Williams, deceased, *v.* Panama Railroad Company, civil docket No. 270. This is a suit for damages in the amount of \$10,000 arising out of alleged injuries resulting in the death of Samuel Augustus Williams, who was employed by the defendant company on its docks in Cristobal. The defendant has filed a demurrer to plaintiff's complaint and also a motion to require the plaintiff to give security for costs.

DISTRICT COURT, BALBOA DIVISION.

Louis Strobel *v.* Panama Railroad Company, civil docket No. 277. This is an action for damages in the sum of \$20,000 arising out of personal injuries alleged to have been sustained in the Gamboa wreck on May 20, 1918. Defendant has filed a demurrer to plaintiff's complaint and also a motion to require the plaintiff to give security for costs.

James J. Towey *v.* Panama Railroad Company, civil docket No. 259. This is an action for damages in the sum of \$2,350.60 based upon alleged personal injuries and the loss of personal baggage which was in the plaintiff's custody at the time of the Gamboa wreck on May 20, 1918. The claim for damages based upon plaintiff's personal injuries was disposed of by compromise through which the defendant paid the plaintiff the sum of \$300. The plaintiff then amended his complaint and asked for \$1,720.60, the alleged value of certain moneys and personal property which he claimed he had on his person or in his custody at the time of the wreck and which were lost. The defendant filed a demurrer to the amended complaint and also a motion to require the plaintiff to give security for costs.

THE SUPREME COURT OF THE UNITED STATES.

Panama Railroad Company, plaintiff in error *v.* Noel Pigott, a minor, by his guardian ad litem, George Morrell, defendant in error, No. 425. This was a suit for \$50,000 damages on account of personal injuries sustained by Noel Pigott, a minor, and which resulted from an accident occurring in the city of Colon, Republic of

Panama. Judgment was rendered against the railroad company in the district court of the Canal Zone, Cristobal division, for the sum of \$7,500. The judgment of the trial court was affirmed by the circuit court of appeals at New Orleans, and thereupon writ of error was sued out from the Supreme Court of the United States by the railroad company, and the case is now pending in that court.

The following Panama Railroad Company cases were disposed of either by judgment or compromise settlement during the fiscal year just ended:

DISTRICT COURT, CRISTOBAL DIVISION.

Edwin Brown *v.* Panama Railroad Company, civil docket No. 297. This is a suit for damages in the amount of \$5,000 arising out of alleged personal injuries sustained by the plaintiff, received at defendant's docks in Cristobal, while in the employ of the defendant. The suit was amicably settled under the compensation act of September 7, 1916, by payment of the sum of \$265.35 to the plaintiff, and thereupon the suit was duly dismissed upon the plaintiff's motion.

James Daley *v.* Panama Railroad Company, civil docket No. 70. This was an action for debt in the sum of \$440.80, arising out of an alleged breach of contract by the railroad company. The plaintiff entered a nonsuit on September 4, 1919, and thereupon the case was dismissed.

T. A. Green *v.* Panama Railroad Company, civil docket No. 97. This was an action for damages in the amount of \$1,000 for injuries resulting in the death of a horse struck by one of defendant's trains in the city of Colon on July 4, 1914. The plaintiff died in the year 1917. The case was settled by compromise with his administratrix, the Panama Railroad Company paying her \$200 in full satisfaction of the claim and the case was thereupon dismissed.

Herbert Evans *v.* Panama Railroad Company, civil docket No. 273. This suit was for damages in the sum of \$5,000 based upon an alleged assault committed upon the plaintiff by the defendant's conductor while the plaintiff was a passenger on one of defendant's trains. A judgment was rendered in favor of plaintiff against the defendant in the sum of \$250, plus \$24 costs on March 31, 1920, and the judgment was satisfied by the defendant.

Louis Harewood *v.* Panama Railroad Company, civil docket No. 256. This was an action for damages in the amount of \$450 arising out of an alleged collision between plaintiff's coach and one of defendant's engines at what is known as the Broadway crossing in Colon. The case was settled by the payment to the plaintiff by the defendant of the sum of \$200, and it was dismissed upon plaintiff's motion.

Charles Haynes *v.* Panama Railroad Company, civil docket No. 292. This was an action for damages in the amount of \$5,000 because of alleged personal injuries received by the plaintiff while in the employ of the defendant on the defendant's docks in Cristobal. The suit was compromised by the defendant paying to the plaintiff the sum of \$500 and furnishing the plaintiff with deck passage from the Isthmus to Jamaica. The suit was thereupon dismissed on plaintiff's motion.

Fitz Gerald Oxley and Louise Oxley, his wife, *v.* Panama Railroad Company, civil docket No. 279. This was a suit for damages in the amount of \$3,000 arising out of alleged personal injuries sustained by Louise Oxley while alighting from a train at Gatun. Compromise settlement was effected by which the railroad company paid to the plaintiff the sum of \$650, and the suit was thereupon dismissed on plaintiff's motion.

Anastasia Pearl, administratrix of the estate of Josiah Blake *v.* Panama Railroad Company, civil docket No. 291. This was a suit for damages in the sum of \$2,220 arising out of alleged personal injuries which resulted in the death of Josiah Blake, who, it was claimed, was run over by a labor train in Colon in 1906. On December 4, 1919, the suit was dismissed without prejudice upon the plaintiff's motion.

Anastasia Pearl has since filed a suit for damages against the Panama Railroad Company in the Panaman courts in which substantially the same issues are presented.

Messrs. Segal and Brockman, copartners, doing business as the Panama-American Junk Company *v.* Panama Railroad Company, civil docket No. 242. This is an action for damages in the amount of \$469.15, arising out of the alleged loss of freight by the defendant's steamship company. The case was dismissed on plaintiff's motion on September 18, 1919.

Clare E. Smith *v.* Panama Railroad Company, civil docket No. 281. This was a suit for damages in the sum of \$12,500 arising out of alleged personal injuries sustained by the plaintiff as a result of being run over by one of the defendant's commissary delivery trucks. The plaintiff recovered the sum of \$2,750, plus \$58.10 costs, upon a verdict of the jury, and the judgment was satisfied by the defendant company.

Abraham Thrope *v.* Panama Railroad Company, civil docket No. 200. This was a suit for damages in the sum of \$1,000 arising out of alleged personal injuries sustained by the plaintiff while in defendant's employ on its docks in Cristobal. The suit was compromised by the defendant paying the plaintiff \$500 and a dismissal of the same was formally entered on September 4, 1919.

Arnold Valencia *v.* Panama Railroad Company, civil docket No. 168. This was a suit for damages in the sum of \$2,000 arising out of the defendant company's alleged failure to deliver plaintiff's baggage aboard the steamship *Danube* and thus causing the plaintiff to delay his sailing. On September 4, 1919, plaintiff entered a nonsuit and the case was accordingly dismissed.

Fred Warden *v.* Panama Railroad Company, civil docket No. 280. This was a suit for damages in the sum of \$5,000 arising out of alleged injuries sustained by the plaintiff at the coaling plant in Cristobal. The suit was amicably settled by payment to the plaintiff of the sum of \$100, whereupon the suit was dismissed on plaintiff's motion.

In addition to these suits disposed of in the Cristobal division of the district court during the fiscal year, the claims of Hubert McPherson and Gurditta Singh *v.* Panama Railroad Company were compromised without suit by the payment of \$500 and \$75, respectively, to the above-named claimants, the first-named claimant being furnished transportation from Cristobal to Kingston in addition to the \$500 paid to him.

DISTRICT COURT, BALBOA DIVISION.

Stanley Bailey *v.* Panama Railroad Company, civil docket No. 274. This was a suit for damages in the sum of \$10,000 arising out of alleged personal injuries received by the plaintiff while in the employ of the defendant company as an electrician's helper at Gamboa. The suit was formally dismissed on December 8, 1919, because of the plaintiff's acceptance of compensation under the act of September 7, 1916.

Camila Castilla *v.* Panama Railroad Company, civil docket No. 292. This was an action for damages in the amount of \$50,000 arising out of the alleged death by wrongful act of plaintiff's decedent, a minor, male, illegitimate child, age 6 years, which met its death in the Gamboa wreck on May 20, 1918. Trial was had before a jury which resulted in a verdict for the plaintiff in the sum of \$1,500. Defendant sued out a writ of error from the United States Circuit Court of Appeals at New Orleans, and the case is now pending in that court.

Bienvenida Cabeza *v.* Panama Railroad Company, civil docket No. 303. This was an action for damages in the sum of \$15,000 arising out of injuries alleged to have been sustained by the plaintiff in the Gamboa wreck on May 20, 1918. The case was amicably settled and the plaintiff received from the defendant the sum of \$2,400 in full satisfaction of all demands, and thereupon the suit was dismissed by the plaintiff.

D'Hlip Singh *v.* Panama Railroad Company, civil docket No. 260. This was an action for the recovery of the value of personal property consisting of money which the plaintiff alleged he lost from his person at the time of the Gamboa wreck on May 20, 1918. Trial was had before a jury and a verdict was rendered in favor of the defendant.

The demand of the plaintiff in his original complaint was for damages in the sum of \$973. However, the railroad company disposed of those elements of damages in the suit involving plaintiff's personal injuries and the loss of necessary personal baggage by payment to him of \$175. The amended complaint upon which the parties went to trial, made a demand for the sum of \$685 and interest—the amount in cash alleged to have been actually lost from plaintiff's person in the wreck.

Grace Garrison *v.* Panama Railroad Company, civil docket No. 316. This was an action for damages in the sum of \$5,000 arising out of alleged personal injuries sustained by the plaintiff in the Gamboa wreck on May 20, 1918. The case was compromised by the defendant paying to the plaintiff the sum of \$2,000, and dismissal of the suit was thereupon entered upon plaintiff's motion.

William Green *v.* Panama Railroad Company, civil docket No. 256. This was an action for damages in the sum of \$5,000 based upon alleged personal injuries received in the Gamboa wreck on May 20, 1918. Compromise settlement was effected by which the railroad company paid to the plaintiff the sum of \$300 and thereupon the case was dismissed upon the plaintiff's motion.

Llewlyn Malcolm *v.* Panama Railroad Company, civil docket No. 248. This was a suit for damages in the sum of \$2,000 arising out of alleged personal injuries sustained

by the plaintiff in the Gamboa wreck on May 20, 1918. The suit was amicably settled by paying the plaintiff the sum of \$100, and a dismissal was formally entered on August 25, 1919.

James Rock v. Panama Railroad Company, civil docket No. 310. This was an action for damages in the sum of \$15,000 arising out of the death by alleged wrongful act of plaintiff's decedent, Rachael Rock, his wife, in the Gamboa wreck on May 20, 1918. Trial by jury was had on May 13, 1920, and resulted in a verdict in favor of the plaintiff in the sum of \$3,000. A writ of error was sued out from the United States Circuit Court of Appeals by the defendant company and the case is now pending in that court.

Mateo Ugalde v. Panama Railroad Company, civil docket No. 235. This was an action for damages in the sum of \$7,500 based upon alleged personal injuries resulting in the loss of some fingers while the plaintiff was employed by the cattle industry at Summit. The plaintiff accepted compensation under the compensation act of Congress of September 7, 1916, and upon his motion the suit was dismissed on November 28, 1919.

The claim of *Maria Joseph v. Panama Railroad Company*, in which no formal suit was filed, and which claim was based upon alleged injuries received by the claimant in the silver market at Ancon, because of an alleged defect in the floor thereof, was settled amicably by paying to Maria Joseph the sum of \$250.

MAGISTRATE'S COURT, BALBOA DIVISION.

The case of the *Panama Railroad Company v. Carlos E. Diez*, was filed in the magistrate's court, division of Balboa, on January 29, 1920, to recover the value of certain automobile repairs made at the railroad company's shops on certain machines owned by the defendant. Judgment by default was obtained against Diez on February 6, 1920, in the sum of \$205.04 with costs.

THE SUPREME COURT OF THE UNITED STATES.

Panama Railroad Company, plaintiff in error, *v. Joseph T. Toppin*, defendant in error. No. 519. This was a suit for damages in the sum of \$15,000 for personal injuries resulting from an accident which occurred in the city of Colon, Republic of Panama. Complaint was filed in the Cristobal Division of the District Court on July 3, 1915. The plaintiff obtained a judgment against the railroad company in the sum of \$10,000. The judgment was affirmed by the United States Circuit Court of Appeals at New Orleans, and a writ of error from the Supreme Court of the United States was perfected by the railroad company; and the Supreme Court of the United States on March 15, 1920, affirmed the judgment of the trial court, and thereafter the said judgment was fully satisfied by the Panama Railroad Company.

LAND LITIGATION OF THE PANAMA RAILROAD COMPANY.

The case of the *Panama Railroad Company v. A. S. Mendez et al.* still remained pending upon the docket of the District Court of the Canal Zone, Cristobal division. This suit was instituted by the railroad company on March 6, 1912, to recover certain lands lying to the east of the railroad line between Colon and Mount Hope. Some time after the President's depopulation order of December 5, 1912, was issued the railroad company asked for the dismissal of this case without prejudice on the ground that the United States had taken over this property and that the defendants had filed their claims before the joint commission for damages on account of the fact that the Government had taken over the land. The motion was denied by the court. The claim of A. S. Mendez and others was tried by the joint commission and was dismissed for want of merit by that body under a rule made on July 2, 1918, which fact had been brought to the attention of the district court by means of a memorandum filed by the district attorney as well as by the defendant company. This case ought not to remain upon the docket of the district court.

The case of the *Panama Railroad Company v. Eufrazio C. de Villalobos and Porfirio Melendez* also remains pending upon the docket of the District Court of the Canal Zone, Cristobal division. This was a suit filed by the railroad company on March 1, 1912, for the recovery of certain lands at or near Toro Point. After the suit was filed, Porfirio Melendez entered his disclaimer, stating that he had no interest in the subject matter of the litigation. The land involved in the suit was taken over by the United States and was dedicated to the military reservation of Fort Sherman,

and is now used as such reservation. This fact was called to the court's attention by the railroad company and a motion was filed upon that ground by the company asking for a dismissal of the case without prejudice. Soon after the joint commission was organized in 1913, the Villalobos family filed a claim before that body asking for damages against the United States for the same property, and this fact has been called to the attention of the district court, but no action has been taken by the court thereon. The Villalobos family failed to appear for the trial of the claim before the joint commission and an absolute rule of default was entered against them in due order by the joint commission. This case ought not to continue upon the docket of the district court.

The case of *Louis Reina v. Panama Railroad Company et al.*, civil docket No. 305, was filed on November 8, 1919, in the Cristobal division of the district court of the Canal Zone. This is a suit to establish the petitioner's interest in the land known as "Rio Indio and Mindi," situated between Forks River and Gatun. The issues in this case were fully disposed of in the case of *Tomas Reina v. Beatrice Pracho et al.*, and the Panama Railroad Company, civil docket No. 139, which was disposed of in the district court of the Canal Zone, Cristobal division, by a judgment of dismissal against the plaintiff, and which judgment was affirmed by the United States Circuit Court of Appeals at New Orleans on March 25, 1919. The land involved in the suit was taken over by the United States about five years ago, and Louis Reina, the plaintiff in the case now pending in the district court, division of Cristobal, together with a number of other claimants, filed their claims with the joint commission seeking an award for damages against the United States.

The claim has been satisfied either by award or by direct settlement by the United States with the claimants, with the exception of the small claim of Louis Reina and Tomas Reina, his brother. Louis Reina and Tomas Reina failed to appear before the joint commission on the day set for the trial of their claim and an absolute rule of default was entered against them by that tribunal. The district court of the Canal Zone is without jurisdiction to entertain the suit of Louis Reina against the Panama Railroad Company for the reason that the United States had taken over the property years before the institution of the suit, and further, an attempt to prosecute the suit in district court of the Canal Zone in 1916 failed for the want of jurisdiction of the court, and though the parties adverse to the railroad and the United States appealed their case to the Court of Appeals at New Orleans, they were unsuccessful, and that court held that inasmuch as their claim was pending before the joint commission, that that tribunal had the exclusive jurisdiction of the subject matter. In my opinion, the suit now pending was instituted for the purpose of harassing the Government into a settlement satisfactory to the attorney for the claimant.

PANAMA RAILROAD COMPANY LITIGATION PENDING IN THE COURTS OF PANAMA.

The Panama Railroad Company retains special counsel in the Republic of Panama to aid in defending the company's interests before the courts and departments of the Republic of Panama. The enforced collection of rentals from lessees of the company's lots in the cities of Panama and Colon is accomplished through the Panaman attorney. In several instances it was necessary to institute suits in order to recover the rent and obtain possession of the land from delinquent lessees, and on occasions action had to be taken through the various administrative departments of Panama and Colon to protect the company's possession of its real estate in those two cities.

The Javillo Realty Co. filed a suit against the Panama Railroad Company on January 19, 1920, in the court of the first circuit of the city of Panama to recover from the Panama Railroad Company a tract of land consisting of 4,000 square meters adjoining the site of the American pier on the shore front of Panama Bay. This property is in the possession of the Panama Railroad Company and is occupied by various parties under license from the railroad company.

Some years ago Messrs. Rodriguez & Uribe, of which firm Mr. Jose Rodriguez R. was a member, entered into a contract with the Panama Railroad Company by which the railroad permitted Rodriguez & Uribe to use its tracks in hauling material from Diablo Hill for the purpose of filling in and reclaiming about 8 or 9 acres in the area lying between the city market and the city of Panama and the American pier. In return for the use of the railroad tracks

as well as for the material taken from Diablo Hill, Rodriguez & Uribe agreed to fill in and reclaim the area in front of the railroad company's property adjoining the American pier, and this is the area which the Javillo Realty Co. is now seeking to recover from the Panama Railroad Company. The fill could not have been made at all without the use of the Panama Railroad Company's tracks, as the cost of the fill otherwise would have been prohibitive. The contract between Rodriguez & Uribe and the railroad company, by which the former was to reclaim the area in question for the latter, was duly recorded and was brought to the attention of the Panaman Government by the Governor of The Panama Canal, who requested the Panaman Government to respect the rights of the Panama Railroad Company under the contract. Later, when deeds were executed for all of the reclaimed area, the subsecretary of Fomento of Panama deeded to the Javillo Realty Co. the 4,000 square meters which belonged to the Panama Railroad Company, and the suit now pending against the railroad company is based upon that deed.

In instituting the suit on behalf of the Javillo Realty Co., Mr. Jose Rodriguez R. alleged that the 4,000 square meters in dispute were worth \$3,000. But the deed that the Javillo Realty Co. received from the subsecretary of fomento fixed its value at \$85,750. This discrepancy was called to the attention of the court, and the Javillo Realty Co. was asked to file a bond in conformity with the value of the property as stated in the deed and not as set forth in the railroad company's complaint filed in the court. The Panaman court agreed with our contention and has required the Javillo Realty Co. to file a bond in the sum of \$8,500, in conformity with the law of civil procedure of Panama. The bond has not been filed, and in all likelihood will not be filed, inasmuch as the Panaman law requires either a money deposit or a mortgage bond. There is no merit in the suit and it will doubtless be dismissed in the near future.

LEGISLATION.

There was but one act of Congress enacted during the fiscal year just ended which was limited in its scope to the Canal Zone. Several congressional enactments of a general character were enacted by Congress which applied to the Canal, such as the various appropriation acts, and some others of a general nature. The act of Congress of special application to the Canal Zone just referred to is entitled:

An act to remove a certain tract or lots of land in Cristobal, Canal Zone, from the operation and effect of the Executive order of the President of December 5, 1912, pursuant to the act of Congress of August 24, 1912 (Thirty-seventh Statutes, chapter 390, page 565). Approved, June 5, 1920.

The purpose of the act was to restore to the Panama Railroad Company its title and possession in the Masonic Temple and the lots upon which it is situated in the town of Cristobal, Canal Zone, so that the Panama Railroad Company might be free to dispose of this property to the Sojourners Lodge of Cristobal. The property is bounded on the north by Eleventh Street of the city of Colon, and on the east by Bolivar Street of the same city, and on the south by lot numbered 649, Cristobal, and on the west by a vacant lot.

Several Executive orders were issued by the President which were prepared in this office or submitted to this office for its examination before they were forwarded to Washington. These orders consisted of the following:

An Executive order, dated December 22, 1919, setting aside for a military reservation the area designated as "Quarry Heights." This area is occupied by the quarters of the commanding general and his staff.

On December 22, 1919, the President set aside an area at Gatun for military purposes, under the designation of "Fort William D. Davis."

On December 30, 1919, the President issued an Executive order setting aside various areas under the designations of "Fort Clayton," "The Panama Arsenal," "The Engineers Depot," and the "Post of Corozal." These areas are located on the Pacific side of the Canal Zone and lie between the Corundu River and Miraflores.

Again on April 9, 1920, the President set aside the reservations known as "Fort Randolph," and "France Field," on the Atlantic side of the Canal Zone, and to the east of the city of Colon.

On January 9, 1920, an Executive order relating to costs in the courts of the Canal Zone was issued by the President. Litigation in the Canal Zone courts has increased very materially in the last few years, and this litigation is not limited to cases arising within the Canal Zone, but involve suits that should more properly be brought in the courts of the Republic of Panama. The intent of the Executive order is to restrict this litigation by limiting the privilege of suing in forma pauperis to citizens of the United States, as is done in the Federal courts of the United States. Heretofore the litigants in civil cases in the Canal Zone courts could demand trial by jury without depositing a jury fee. The Executive order requires the payment into court of a jury fee of \$10. This is one-half as much as is required in the courts of the United States. It is only fair that litigants should contribute in some degree to the costs of litigation. Jury trials in the Canal Zone are very expensive to the Government and the Panama Railroad Company, inasmuch as the juries are necessarily made up of Panama Canal and Panama Railroad Company employees who are taken from their work to the detriment of the service.

The act of Congress known as the "Volstead Act," which regulates the manufacture, production, use, and sale of high-proof spirits for other than beverage purposes, and to insure an ample supply of alcohol and promote its use in scientific research and in the development of fuel, dye, and other lawful industries, effective October 28, 1919, provides that the enforcement of the act in the Canal Zone shall be under the control of the President, who is authorized to establish suitable regulations for that purpose. On January 7, 1920, the President issued an Executive order, entitled:

Executive order establishing prohibition regulations for the Canal Zone in conformity with the act of Congress.

By virtue of this order, the administration of the regulations is placed in the chief health officer of The Panama Canal under the direction of the Governor. The order prohibits the importation of intoxicants into the Canal Zone, except under the conditions prescribed in the order; that is to say, liquors for sacramental, scientific,

industrial, pharmaceutical, and medicinal purposes, may be introduced under the conditions prescribed in the Executive order. Punishment by a fine of not more than \$1,000 and imprisonment of not exceeding six months for the first offense, and by a fine of not less than \$200 or more than \$2,000 and imprisonment of not less than one month nor more than five years for a second and subsequent offense is prescribed in the order in conformity with the act of Congress.

On February 11, 1920, the President issued an Executive order authorizing charges for services rendered by the quarantine division of The Panama Canal. By virtue of this order, the Governor may, from time to time, establish a schedule of charges to cover services rendered by the quarantine division of The Panama Canal in the disinfection of vessels and their cargoes, for the transportation and subsistence of passengers while in quarantine, for placing guards aboard vessels when necessary, and for the inspection of vessels outside of the regular hours. These charges shall be paid to The Panama Canal by the person or interest receiving such service. All the laws, ordinances, and regulations in conflict with the order are repealed.

On March 1, 1920, the President set aside a part of the Punta Mala Lighthouse Reservation for the purpose of the Punta Mala Naval Radio Station, subject to the civil jurisdiction of the Canal Zone authorities. The lighthouse reservation, from which the site for the naval radio station was taken, was designated by an Executive order of the President some years ago. The area set apart for the radio station is approximately 13.7 acres.

The Executive order of November 7, 1913, and other laws, orders, and regulations relating to the keeping and carrying of arms in the Canal Zone, did not meet the present conditions existing in the Canal Zone. The opening up of large areas by the cattle industry and the depopulation of towns along the Canal and the railroad, the occupancy of considerable districts of the Canal Zone by the Army, and other changes in conditions here, required an amendment in the laws bearing on the carrying and keeping of arms. In consequence, upon the recommendation of the Canal Zone authorities, the President issued an Executive order on March 6, 1920, to regulate the carrying and keeping of arms. This order repeals all previous laws, orders, and regulations. Its provisions are much more elastic than those found in the preexisting laws; and the Governor is given a wider latitude in withdrawing or extending the rules prescribed by the order to the various sections of the Canal Zone. The Executive order is based on section 4 of the act of Congress authorizing the President to make rules and regulations relative to police powers in the Canal Zone, approved August 21, 1916.

Experience had demonstrated that the quarantine regulations adopted for the Canal Zone and harbors of the cities of Panama and Colon were too rigid. These regulations were an adaptation of the quarantine regulations in force in continental United States. The operations of The Panama Canal developed conditions with respect to quarantine that are not to be found elsewhere, and it is fair to assume that new conditions will continue to arise, and in order to meet them an elastic system of regulations, within the control of the Governor, are necessary. The chief quarantine officer, after several conferences with this office, submitted new regulations, which met

with the Governor's approval and were forwarded by him to the President with the recommendation that they be promulgated in lieu of all preexisting regulations. Pursuant to the Governor's recommendation, the President, on March 31, 1920, issued an Executive order establishing maritime quarantine regulations for the Canal Zone and harbors of the cities of Panama and Colon, Republic of Panama, and all laws, orders, and regulations in conflict with that order were thereby repealed. The Executive order grants to the Governor authority to establish from time to time the necessary rules for the enforcement of the regulations established by the Executive order, and in doing this many provisions of the old law are eliminated, and their omission from the law will be supplied from time to time, when the needs of the Canal demand it, by rules to be issued by the Governor of The Panama Canal.

This office also disposed of a number of matters of an advisory character during the fiscal year at the request of the Governor, the heads of departments, and divisions of The Panama Canal and the Panama Railroad Company, and the Washington authorities.

Respectfully,

FRANK FEUILL^W,
Special Attorney.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal,
Balboa Heights, Canal Zone.

APPENDIX I.

REPORT OF THE CHIEF HEALTH OFFICER, HEALTH DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *July 20, 1920.*

SIR: I have the honor to submit the following report of the operations of the health department for the fiscal year 1920:

GENERAL REMARKS.

One case of yellow fever off a ship from Corinto, Nicaragua, was admitted to Balboa quarantine August 10, 1919. This was a boy who had contracted the disease in Leon, Nicaragua. He died two days later at Ancon Hospital. There have been no cases of yellow fever originating on the Isthmus since 1905.

Eleven cases of leprosy were admitted to Palo Seco Leper Asylum, all from the Canal Zone and the Republic of Panama.

An influenza epidemic started the first part of March, 1920. Cases of influenza and deaths from influenza and pneumonia were reported, as follows: March, 801 cases and 50 deaths; April, 314 cases and 52 deaths; May, 40 cases and 24 deaths; June, 138 cases and 7 deaths. The first cases were from Colon but later cases were reported from all parts of the Canal Zone and Panama and its suburbs. The schools, motion picture shows, and other places of assembly were closed for a period of two weeks. The majority of cases reported were among people who were ill-fed and physically weak—owing to their poverty—which condition was markedly prevalent immediately after the strike of February 24 to March 4. The epidemic probably started from the fleet of United States Naval vessels stationed in Colon bay from February 19 to March 1, of which the steamship *Colombia* had 10 cases and the steamship *Pennsylvania* 5 cases of influenza on board; the fleet reported 30 cases before arrival in Colon. The rise shown in number of cases reported during the month of June was the result of a local epidemic at the cattle pasture camp at Manawa—there being 82 cases from this camp during June. On March 21, 1920, a ship from Ecuador was received at Balboa quarantine with six cases of influenza on board; June 23, 1920, a ship from Peru was received at this station with 23 cases on board; in both cases the local passengers were detained in quarantine three days, and crew and other contacts among agents and port employees were observed and temperatures taken for three days. No new cases developed.

There were 28 cases of smallpox reported during the year. All were of a benign type, and no deaths resulted. Systematic vaccination was continued in the cities of Panama and Colon, and a vaccinator was sent to some of the interior towns of Panama, performing

vaccinations on all nonimmunes that could be reached. There were 2 cases in hospital on June 30, 1920.

No other maritime quarantinable diseases than those above enumerated arrived at or originated on the Isthmus during the year.

A free venereal disease clinic where both curative and prophylactic treatments are given, was established at Santo Tomas Hospital in Panama on August 25, 1919, and one at Colon—maintained by the American National Red Cross—on March 1, 1920. An educational campaign has been pushed, pamphlets distributed in English and Spanish, and moving pictures dealing with this question shown. A notice, warning against all prostitutes, is handed by the quarantine officers to the crews of all incoming vessels. Meetings with Panaman, Canal Zone, military officials, and representative citizens have been held at which the program of attack as carried out in the United States was approved as the program for the Isthmus. However, as yet conditions in Panama and Colon remain basically unchanged. The standard forms of laws for the repression of prostitution and control of venereal diseases as compiled by the commission on training camp activities of the War and Navy Departments, were long ago submitted to the officials of the Panaman Government upon their request, but they have not seen fit to pass any laws modeled upon them. A number of alien prostitutes have been deported to their native countries, but prostitutes are still numerous in the two terminal cities. The incidence of venereal disease is very high in this portion of the world, and the existing conditions are deplorably unsatisfactory. The health department is powerless to control the high incidence of venereal disease without the cooperation of Panaman authorities able and willing to pass and enforce proper laws for its control.

The following table shows the probable place of infection of all malaria cases reported during the past two years:

	Employees.		Nonemployees.		Total.	
	1920	1919	1920	1919	1920	1919
Sanitized areas of the Canal Zone.....	202	184	407	779	609	963
Pasture camps and plantations.....	149	292	8	35	157	327
Other areas in the Zone, outside sanitized districts ¹	12	21	20	90	32	111
Colon.....	54	36	52	63	106	99
Panama.....	49	32	79	110	128	142
Areas outside the Zone and the terminal cities ²	77	32	261	550	338	582
Total.....	543	597	827	1,627	1,370	2,224

¹ There are practically no residents in these areas. All cases reported were residents of the Zone or terminal cities who received their infection while hunting, riding, etc.

² These cases are from interior towns, other countries, steamships, etc.

The average total number of employees during this fiscal year was 21,716, of whom an average of 881 were employed at cattle pasture clearing and on plantations during the year. This gives an annual rate per thousand for the two terminal cities and the sanitized area of the Canal Zone, for employees only, of 14.64 in 1920, as compared with 10.81 in 1919, while the rate for the pasture camps and plantations, for employees only, was 169.13 in 1920, as compared with 240.53 in 1919.

While apparently decreasing, the infant mortality continues high. Several factors contribute to this high rate, chiefly ignorance and poverty, and the hygienic and dietic errors that accompany these. Children of white American parentage living in the Zone do exceptionally well.

Pneumonia continues to be one of the chief causes of death, especially in the densely populated sections of Panama and Colon where, in spite of efforts to improve ventilation and lighting, many employees and their families are herded together in entirely inadequate quarters. It is a matter of frequent comment by Canal Zone physicians that sickness is far less prevalent in the modern, well-planned Canal quarters than in the tenements of the two cities.

The highest death rate of the Isthmus is still due to tuberculosis, to which disease also applies what has been said of pneumonia. In recent years a reduction in the number of cases is apparent, but no radical improvement in this condition may be expected until the housing situation in Panama and Colon is materially improved, adequate hospital facilities provided, and a comprehensive plan of campaign of education and prophylaxis developed. A number of the tenement houses in Colon and Panama have been remodeled for the purpose of admitting sufficient light and ventilation. Pamphlets explaining the dangers and precautions necessary in combating the spread of this disease have been distributed freely. This educational measure is being further augmented at Colon by a visiting nurse who gives instructions, both oral and written, to the responsible members of the family about the precautions necessary to prevent the transmission of the disease to other members of the family. There is a real pressing necessity for more quarters being constructed of the right kind for our "silver" employees, such as are provided at La Boca on the Pacific side, Red Tank at Pedro Miguel, and Silver City at Cristobal. La Boca, especially, is a model town of its kind, with wide, well-paved streets, planting spaces and lawns, screened houses with modern plumbing, and a well-supplied commissary and restaurant. By constant supervision and training the colored population of this city has been given an education in sanitation that is evidenced in their appearance and surroundings and which could well be emulated by people of a relatively higher social strata and culture.

Another effort on the part of The Panama Canal to improve living conditions for its laborers, especially those whose employment is of a temporary nature, is seen in the reopening of a portion of the Zone to unemployed, able-bodied men, who are given quarters and a generous portion of land to cultivate, in return for which a nominal rent is paid and the tenant obligates himself to work for The Panama Canal a stated portion of the year, if called upon, at the regular rate of pay for labor of the kind he performs. The old town of Las Cascadas, on the west bank of the Canal, since construction days and until recently used as an Army post, has been assigned for this purpose, as here are already available quite a number of houses and an adequate water supply. If the unemployed Negro can be induced to take advantage of this proposition, it will help solve one of our most difficult problems—that of providing a reservoir of labor for emergency use that will be self-supporting between periods of employment.

Where it is possible to do so, employees living in regular Zone settlements are encouraged to engage in gardening outside of working hours, and adjacent tracts of land are designated for this purpose. As drainage operations advance, more and more ground is made available for cultivation, and it is hoped that ultimately every family that so desires may have their own garden spot where a greater part of their food can be grown.

VITAL STATISTICS.

EMPLOYEES.

A new method of finding the average number of employees was adopted during the fiscal year. In previous years the total number of names on the pay rolls each month was taken as the number of employees, and the average force was considered as the average of the 12 monthly statements. Inasmuch as many of the silver-roll employees were in casual employment and their names appeared twice or several times on the rolls, the average thus deduced was larger than the facts warranted. It was, therefore, decided to consider the average force as that represented by the number actually at work on the second and last Wednesday of each month, except that in the case of the docks and coaling plants the average force for the month is used. The result of this change of method has been to make our basis for statistics of employees more accurate than heretofore, but it has also resulted in giving a base for 1920 which is not properly comparable with that for the previous years.

In determining the division by race, a careful study of the silver-roll force was made to determine how many persons properly classed as "white" are in that force. It was decided to use 500 as the number. Our segregation by race is, therefore, determined by subtracting 500 from the silver-roll numbers and adding 500 to the gold-roll numbers.

The average number of employees on the rolls of The Panama Canal and the Panama Railroad for the year was 21,716, as compared with 20,172 for the fiscal year ended June 30, 1919.

The total admission rate to hospitals and quarters was 658.45, as compared with 617.79 for the fiscal year ended June 30, 1919. The total admission rate to hospitals only for the year was 225.69, as compared with 235.82 for 1919, and for disease alone 192.48, as compared with 204.09 for 1919.

The total death rate for 1920 was 9.49, as compared with 8.43 for 1919. The noneffective rate for 1920 was 14.85, as compared with 16.87 for 1919.

The total admission rate for malaria, hospitals, and quarters, was 25, as compared with 29.60 for 1919. The constantly noneffective rate, hospital and quarters, was 0.70, as against 0.74 for 1919, and 0.72 for 1918.

The admission rate for typhoid fever was 0.18, as against 0.10 for 1919; there were no deaths from typhoid fever in the years 1918, 1919, and 1920.

The death rate from tuberculosis (various organs) was 1.43, as compared with 1.49 for 1919. The death rate from pneumonia (lobar) was 0.83, as against 0.99 for 1919.

The five diseases causing the highest number of hospital admissions, with their rates, were as follows:

	Number of hospital admissions.		Rate per 1,000.	
	1918-19	1919-20	1918-19	1919-20
Influenza.....	596	604	29.55	27.81
Veneral diseases.....	459	548	22.75	25.23
Malaria.....	516	503	25.58	23.16
Diseases of the eyes and their annexa.....	124	156	6.15	7.18
Tuberculosis.....	52	47	2.58	2.16

The five diseases causing the highest number of deaths, with their rates, were as follows:

	Number of deaths.		Rate per 1,000.	
	1918-19	1919-20	1918-19	1919-20
Tuberculosis (various organs).....	30	31	1.49	1.43
Pneumonia (broncho and lobar).....	24	25	1.19	1.15
Influenza ¹		21		.97
Chronic nephritis.....	8	19	.40	.87
Organic diseases of the heart.....	16	10	.79	.46

¹ Many deaths are reported as "Influenzal pneumonia"; until the present year these were classified as "pneumonia," which accounts for no deaths from influenza among employees for last year.

EFFECTS OF RACE.

For disease only, the admission rate to hospitals and the death rate for white employees was 287.16 and 3.37, as compared with 168.10 and 9.32 for black employees. The noneffective rate for disease and injuries for white employees was 18.11, as compared with 14.01 for black employees.

CANAL ZONE.

The average population for the Canal Zone for the year was 30,954, as compared with 21,707 for the last year. Military population is included in the report for this year; during the period of the war the military population was not included in any of the statistical rates of this report, except in the table under sanitation showing total malaria cases and percentages.

From this population 253 deaths occurred during the year, 219 of which were from disease, giving a rate of 7.08 for disease alone, as compared with 9.40 for 1919.

The death rate from tuberculosis was 0.81, as compared with 1.34 for the year 1919. Deaths from tuberculosis this year were 10 per cent of all deaths.

The birth rate for the year was 22.26. The infant mortality rate, based on the number of births reported for the year, was 34 for white and 153 for black children, with a general average of 110.30. Of the total births reported, 6 per cent were stillbirths.

Of the total deaths reported, 45 per cent occurred among children under five years of age.

PANAMA CITY.

The average population of the city for the year was 61,369, the census not having been taken since June, 1917. From this population, 1,278 deaths occurred during the year, of which 1,234 were from disease, giving a rate of 20.11 for disease alone, as compared with 21.85 for the preceding year. Tuberculosis gave a death rate of 3.80, as compared with 4.30 for 1919 and 4.53 for 1918; this was 18 per cent of the total deaths, as compared with 19 per cent for last year.

The principal causes of death, compared with last year, were as follows:

	1918-19	1919-20
Tuberculosis (various organs).....	264	233
Pneumonia (broncho and lobar).....	168	193
Diarrhea and enteritis.....	130	159

There were 2,393 births reported for the year, giving a rate of 38.99. The infant mortality rate, based on the above number of births was 150.44. Of the total number of births reported 8 per cent were stillbirths.

Of the total deaths reported 42 per cent occurred among children under five years of age.

COLON.

The average population of the city for the year was 26,078, the census not having been taken during the past year. From this population, 567 deaths occurred during the year, of which 527 were from disease, giving a rate of 20.21 for disease alone, as compared with 23.28 for the preceding year.

The principal causes of death as compared with last year were:

	1918-19	1919-20
Tuberculosis (various organs).....	108	101
Nephritis (acute and chronic).....	38	56
Pneumonia (broncho and lobar).....	89	47

There were 1,001 births reported for the year, giving a rate of 38.38. The infant mortality rate, based on the number of births, was 136.86. Of the total births reported, 5 per cent were stillbirths.

Of the total deaths, 38 per cent occurred among children under 5 years of age.

ANCON HOSPITAL.

[Col. Louis T. Hess, U. S. A., Superintendent.]

Permanent buildings.—The bakeshop, located in the kitchen mess halls building, was found unsatisfactory for the purpose designed owing to cramped space, inconvenient location of ovens, and lack of insulation in ceiling over ovens, upon which is situated the floor of the diet kitchen; it was evacuated as such and occupied by the general mechanic as a workshop and storeroom. All bakeshop

apparatus was dismantled and will be reinstalled in that part of the power plant building now housing the carpenter and electrical shops. A two-story addition to the power plant building is being erected, the ground floor of which is for the carpenter shop—twice as large as the former shop; the second floor will be used for electrical shop and electrical stores and for the miscellaneous general supplies of carpenters, painters, and plumbers.

Building 210, maids' quarters, was removed from its former location and is now situated to the right of the laboratory in what was formerly the poultry yard.

Building 246, which was used as a chronic ward, was razed by the supply department for recreation at one of their plantations, and the chronics were transferred to Corozal Hospital.

Roads.—In order to reduce to a minimum all noise nuisances, the main hospital road, which is now named "Gorgas Road," was made a one-way road, downhill only, and the hospital interior road closed to public traffic.

Grounds.—All lawns have been graded and sodded, and many flower beds, plants, trees, and hedges have been set out around the hospital buildings. Considerable work has also been done on the hillside in the rear of the hospital buildings. Rocks have been picked off to fill depressions at foot of the hill, which have then been graded off with dirt dressing. One hundred orange trees, 50 grapefruit trees, and 25 avocado trees have been set out on this hillside.

Surgical clinic.—During the year 1,994 major operations and 4,831 minor operations were performed. There were 3,134 cases visited the out-patient department; 314 obstetrical cases were delivered.

Medical clinic.—There were 2,611 cases treated in the out-patient department, for whom 1,707 prescriptions were written.

Eye and ear clinic.—There were 7,443 cases examined or treated in the out-patient department, for whom 2,606 prescriptions were written, 967 refractions were made, and 976 operations performed.

X-ray clinic.—A total of 3,333 cases were handled; 7,197 plates and 1,708 dental films were taken and 84 treatments given. The following new apparatus was installed in Ancon Hospital X-ray laboratory during the year: One bedside X-ray unit, for service in the hospital at bedside of patients; 1 United States Base Hospital trochoscope; 1 horizontal plate changer for chest plates, with stereographic tube stand; an overhead high-tension switch; new screens, tunnels, and reels. In addition, some improvements were made on the vertical fluoroscope and on the stereoscope, bringing them up to date.

Steward's department.—During the year the patients' dining rooms for white and colored males were put in service. There were 164,218 rations issued to Ancon Hospital patients and 92,790 rations to personnel entitled to same, a total of 257,008 rations; the net cost of same was \$101,972.55, exclusive of preparation and serving.

Maintenance and repairs.—The usual routine repairs were made by the hospital artisans, and in addition miscellaneous furniture and supplies were manufactured and certain changes and additions made to buildings, the principal items being sanitary drinking fountains, additional sinks, lockers, shower baths, and toilets installed in various sections of the hospital; most of the beds, bedside tables, and chairs were renamed; various doors were lettered; wooden strips were placed over screening on verandas to protect screening; 127

coffins were manufactured; also flower stands, tables, and water sprinklers; partitions were installed in isolation ward.

Comparative statistics.—The following table is for Ancon Hospital, including Corozal Hospital:

	1920	1919	1918	1917
Patients, nonresilient of the Canal Zone, Panama, or Colon:				
Numbers admitted.....	1,294	939	586	350
Days treated, total.....	39,782	31,779	28,089	26,497
Military patients:				
Numbers admitted.....	779	1,392	4,165	2,469
Days treated, total.....	14,672	22,217	49,067	33,494
All classes of patients:				
Numbers admitted.....	10,393	10,679	12,436	11,170
Days treated, total.....	306,079	312,737	319,908	311,451
Cost of subsistence supplies per patient per day—Ancon Hospital only.....	\$0.3967	\$0.3495	\$0.315	\$0.3369
Cost of treatment of hospital patients, including subsistence, medicines, and all attendance—Ancon Hospital only.....	\$3.43	\$2.67	\$2.78	\$2.35

BOARD OF HEALTH LABORATORY.

[Dr. Lewis B. Bates, Chief.]

The influenza epidemic this spring necessitated a large amount of laboratory work. Owing to the sudden and temporary increase in the malaria rate, mostly at the Atlantic end, just at the beginning of the year, an effort was made to ascertain the malaria index of Camp Bied, Cristobal, a laboring camp from which many cases were coming. Blood films and spleen examinations were made on 514 individuals. The splenic index was 13 per cent, the parasite index 0.4 per cent. The enlarged spleens were mostly found in natives from the interior who had been recently employed.

The determined effort being made by the health officer of Panama to give the city of Panama as pure a milk supply as that enjoyed by the Canal Zone and the best-regulated communities in the United States has necessitated the bacteriological and chemical examination of a large number of milk specimens, and with the continuation of this plan this work will become a part of the permanent routine of the laboratory.

There has always been a demand for the laboratory to do a larger number of the simpler examinations, such as the examination of blood films for malaria parasites, eye smears for the gonococcus, urines for albumin, and similar examinations. It has been found advisable for the laboratory to meet this demand, and an increasing amount of this work is being done.

The work in the chemical laboratory has been of the usual general character. It has included the examination of milks, beverages, drugs, canned foods, miscellaneous supplies, as well as clinical examinations requiring quantitative determinations. As a routine measure, toxicological examinations have been made in every instance of death from unknown causes. In addition to the work done, preparations have been made to extend the scope of the work in blood chemistry so that all quantitative determinations for diagnostic purposes may be made rapidly and in as large numbers as desired.

The entomological department covered the field of medical, sanitary, and economic entomology, with special reference to the identi-

lication of mosquitoes, of other arthropods affecting the health of man and animals, inspection of mosquito-breeding areas, the study of insects infesting food and stored products, household insects, forage-crop insects, vegetable and truck crop insects, and the study of the more important pests of tropical fruit trees. The work in economic entomology was of a cooperative nature with the bureau of entomology, United States Department of Agriculture, which bureau had established a temporary field station at this laboratory and detailed an entomological inspector of the Federal horticultural board in charge of the station; upon the departure of this inspector in August, the project was placed temporarily in charge of the board of health entomologist as collaborator of the bureau. The main object of the temporary field station is to learn what dangerous pests occur in the Canal Zone, and whether the concentration of traffic and commerce from all parts of the world is not adding new and serious pests to our territory. Such dangerous immigrants, together with the endemic pests, would be potential menaces to continental United States. The surveys and inspections made thus far, covering a period of about two years, have yielded a large amount of valuable information regarding pests already established, and that our piers, especially those at Cristobal, are splendid mediums for the introduction into the Canal Zone of new and serious enemies. Such insects are also a danger to other cargo on the piers awaiting transshipment because it is very easy for eggs or other stages of these insects to reach such cargo and thus reach other ports. These facts indicate the necessity for a port-inspection and plant-quarantine service, with adequate facilities for vacuum fumigations at both terminals, as the only means which will protect against such dangerous insects.

The professional staff of the laboratory remains the same, but the number of technicians has been increased to six, on account of the increased work.

COROZAL HOSPITAL.

(Dr. Louis Wender, Superintendent.)

The general admission rate has been about the same as in previous years. On June 30, 1920, there were 344 patients in the hospital, and 26 chronic cripples. During the year a large number of patients were deported to their native homes. Various forms of amusement have been continued. The occupational department where rugs, hats, and other small items have been made, received a new impetus the latter part of 1919. The officers of the Mental Hygiene Society in New York sent down, free of charge, an industrial instructor who remained here three months, established a workroom and instructed the chief nurse in the essentials of an industrial department. The occupational department has been established on a high standing, as in the best hospitals in the United States. Our patients, although of a lower strata, have taken up with this work very enthusiastically and are making rugs, toys, children's furniture, weaving bags, block printing, wood carving, etc. This kind of work is very beneficial to this class of patients, as it not only removes them temporarily from their world of fantasy, but also reeducates them and stops their mental deterioration. Most of the articles made have met a ready sale, and it is hoped that in the future this department will more than pay for itself. This

new undertaking has not curtailed any of the previous work, such as farming, laundry work, or work in the sewing room. Most of the male patients are still cultivating the land; we have opened up several acres of new land with patient labor, planting most of it in yams. Machinery for making brooms has been ordered and will be installed in the next few months. This will necessitate a building and the installation of light machinery. In this building we will be able to train some of our patients along with the cripples in various kinds of industry.

Buildings.—The new hospital ward "K," which was erected during the year, with accommodations for 80 patients, was occupied in January. The ward which was previously occupied by the working patients is now used as an isolation ward for tubercular patients and two cases of nerve leprosy that are also insane. The new ward has relieved the congestion to a certain extent, but it was necessary to transfer 26 chronic cripples from Ancon Hospital to this hospital, in order to complete the removal of old hospital buildings at Ancon.

A road from the dairy to the new feeding platform for pigs was built by our own help, and a feed room has been constructed at the end of the platform. The chicken house was demolished and the old lumber used for the construction of new feed room. A fence has been placed around the new feeding platform and the use of the platform has been started.

The second-story porches and the roofs over same in most of the buildings have been painted. The male and female dining rooms and the kitchen were also painted.

An addition has been built to the nurses' quarters, adding four rooms with a front and back porch. The reception room was enlarged and refinished.

A new coal bin has been built to facilitate the unloading of the coal cars on the siding.

Grounds.—The grounds in the hospital inclosure have been kept in order by the patient's help. One thousand feet of drain has been laid in the hospital grounds by them, improving the appearance of the grounds as well as the sanitation. All the walks in the inclosure have been repaved, and new cement walks have been laid around the hospital quarters by our patients.

Dairy.—Part of our pastures were cleared during the year. On December 9, 1919, 25 Holstein cows arrived from the States. We were unable to obtain them except from the noninfected tick area in the States, and it was therefore necessary to immunize them here against the tick fever. The inoculation was done by the staff of the board of health laboratory; these cows were from 2 to 4 years of age, and six died probably as a result of the inoculation. One registered Holstein bull calf was purchased from the cattle industry as sire for this year. As this bull was too young, we obtained, through the kindness of Mr. Frank O. Arias, of Panama, the loan of a registered Holstein bull, without charge, which is being used with the Holstein cows.

Part of the equipment for the refrigerating apparatus for the milk room has arrived, and we hope to have this installed shortly; this will enable the cooling of the milk to be done by mechanical refrigerating, thus reducing the cost and also lessening the amount of handling.

Our milk has continued to be of a high standard, being pasteurized morning and evening after milking; it shows a low bacterial count and a fat percentage of 4 to 5.

The tuberculin test has been made of all cows. On June 30, 1920, the herd consisted of 3 bulls, 74 cows, and 38 calves.

Piggery.—Most of our pigs, after being fattened, are sold to the supply department. Since the early part of November a pig has been slaughtered each week for the use of Ancon Hospital. On June 30, 1920, we had on hand 27 hogs and 120 pigs.

Garden.—With the high cost of seed and labor, the garden has been a losing proposition, and it was deemed advisable to reorganize the farm. This has now been effected; the cripples, instead of receiving a salary, are given lodging and subsistence, and a tract of land to cultivate as they please; seeds are furnished them at cost, and sale of their products is handled by the farm.

We have had no success in raising rabbits for the board of health laboratory, as most of them die of coccydiosis. We are now more successful than formerly in raising guinea pigs, and our stock is gradually increasing.

The number of cripples remaining at the hospital June 30, 1920, was 4 white and 27 black, being a reduction of 21 during the year.

COLON HOSPITAL.

[*Maj. Guy L. Quails, U. S. A., Superintendent.*]

Colon dispensary, which is located within the hospital, is under the direction of the hospital, and it is necessary to correlate and harmonize the work of the dispensary with that of the hospital. The Colon district physician has charge of the medical cases in hospital. One of the staff physicians and the medical interne assist the district physician in this work. The superintendent has charge of surgical cases and supervises all work of the hospital and dispensary.

Emergency cases from the dispensary are admitted to Colon Hospital; others, both medical and surgical, are transferred to Ancon or Santo Tomas hospitals. Efforts are made to keep the number of patients under treatment at Colon Hospital to 50 or below.

During the past year much work and effort has been expended toward beautifying the hospital grounds. Considerable dirt fill will be necessary in the near future in front of the hospital if appearances are kept up to what they should be. At present grass can not be grown over the area nearest the bay on account of lack of sufficient earth, the coral formation supporting very little vegetable growth.

The institution is located in an almost ideal place for a tropical hospital. The surrounding grounds are ample for a much larger institution. It is believed that with the growth of Cristobal, Colon, various Army and Navy posts and stations, the increased amount of shipping and business on this side of the Isthmus, the demand will be urgent for new construction in order that infectious diseases originating on this side of the Isthmus and those brought in by ships may be treated here. A ward for the care of a larger number of obstetrical cases will soon be a necessity.

As the Republic of Panama does not maintain a hospital on this side of the Isthmus for the care of its indigents, it is believed that

the installation of a charity ward attached to this hospital and supported by the Republic of Panama should receive serious consideration.

The hospital building proper has been rescreened during the past year and necessary reinforcements to screening have been placed in the wooden framework in order to withstand the strong winds of the dry season. This work was done by the hospital artisan, and has reduced the cost of renewing screening considerably.

As mentioned in last year's report, the paint on the interior walls of the hospital has cracked and peeled off badly. Sufficient funds for repainting were not available last year, and with the big cut in our estimates, we will probably not be able to paint the interior of the hospital this coming year.

The reports of professional work of consequence are published in the statistical tables, and it is unnecessary to repeat them here. It would also be futile to render them in a more condensed or informative manner.

SANTO TOMAS HOSPITAL.

[Maj. E. A. Boccock, U. S. A., Superintendent.]

Owing to the many improvements made during the year, this institution—of which the superintendent, two physicians, chief nurse, and two ward nurses are employees of The Panama Canal—deserves special mention. Although the institution is financed by the Republic of Panama, with the exception of paying the above employees, we are vitally interested in its operation and management.

Training school.—On January 30, 1920, the third graduating class of the Santo Tomas Hospital Training School for Nurses, consisting of nine nurses, finished the course and received their diplomas. This makes a total of 28 Panaman nurses who have been graduated from this school since its beginning. The training school has made steady progress throughout the entire year.

General.—The buildings, many of which are very old and practically falling down, have been repaired, painted, and rendered habitable for another year. All the debts of the institution, of which there were a large number, have been paid during the year and its credit reestablished. A practical system of bookkeeping and property accounting has been instituted and a systematic survey of the financial and economic situations made and applied. In addition to this all attention possible has been devoted to improving the professional services of the hospital, and while this is far from being ideal it is undoubtedly advancing in efficiency. The principal new works that have been undertaken during the year were the establishment of the venereal clinic and the beginning of construction of the new Santo Tomas Hospital.

Venereal clinic.—On August 25, 1919, a venereal clinic was established at this hospital, on a plan similar to the clinics conducted by the Public Health Service in many parts of the United States. Since its beginning this clinic has met with complete and somewhat gratifying success. From September 1, 1919, to June 30, 1920, there have been 2,134 new admissions to the clinic: of these 1,513 were men and 621 women. During this period the patients under the care of the clinic received 11,241 treatments, dressings, or consultations. Salvarsan to the extent of 568 doses was administered, as well as 762

injections of mercury. Surgical operations numbering 318 were performed upon clinic patients. The treatments given in the clinic are absolutely free to all persons who are unable to pay, but a slight charge is made in cases where the patients have some means. Wassermann examinations are made on practically all patients reporting to the clinic, and free Salvarsan is given whenever indicated.

New Santo Tomas Hospital.—For many years it has been the hope of the Panaman Government to construct a new and modern institution, but owing to numerous political changes, financial deficiencies, etc., it has never been possible to make this project a reality until the year 1919. At that time the National Treasury of the Republic was receiving approximately \$25,000 per month from the liquor tax and the national lottery, and with this money it was decided to commence the construction of the new hospital. Several sites around the city were investigated and it was finally decided to construct the new institution at a site known as El Hatillo, which is a high point facing the Pacific ocean, in the suburbs of the city of Panama. The official ground breaking took place on November 15, 1919, and since that date active work has been carried on until the present time, and the construction work is now well underway.

The layout of the institution will cover approximately 14 acres, or nine city blocks, and when completed will have cost about \$1,000,000. The buildings, which will be 12 in number, will be arranged in rectangular form, fronting by the main building which will face the sea, and flanked on either side by annexes and contagious disease and tubercular sections. The buildings will be of reinforced concrete and concrete blocks, and the whole layout will be linked together with a meshwork of streets and sidewalks affording easy access to every part of the grounds. A retaining sea wall is being constructed along the entire frontage of the institution, which will control the unusually high tide that is present on this part of the Pacific coast. The space of 4 acres just between the front of the hospital and the sea wall will be occupied by ornamental gardens filled with tropical plants and flowers, with a fountain in the center. From Panama City an elegant boulevard is being constructed along the seashore to the front of the new institution, and the lands adjacent to the hospital grounds are being filled and leveled in order to make the surroundings sanitary.

The main building of the new hospital will be 210 feet in length, 60 feet in width, and four stories high, and will be augmented by three annexes of practical similar size, which will be joined by corridors to the main building. The venereal, infectious diseases, and tubercular sections will be separate buildings, or in reality hospitals in themselves, each having a capacity of approximately 100 patients. The total capacity of the entire institution will be 600 patients normally, with facilities for emergency crisis expansion to 900 patients. Adequate quarters are being provided for the several staffs of doctors and nurses, and separate buildings are under construction for the laboratory, morgue, power house, kitchen, shops, and vehicles. A laundry and bakery will be included in the utilities of the new institution. Classrooms for the nurses training school and for the post-graduate school of tropical medicine which is contemplated, will also be included in a separate building.

Modern equipment and facilities will be installed throughout the new institution. Sound proof walls, silent bell-call system, floor lights, and inclosed clothes chutes will be installed in each of the hospital buildings. The hospital will be equipped with four large operating rooms connected with the X-ray suite, and the surgical equipment in these departments will be modern in every way. The entire fourth floor of the main building will be devoted to the surgical and X-ray suites, the third and second floors to medical and surgical wards, and the first floor to offices, library, and classrooms. The entire basement of the main building will be occupied by the dispensaries, venereal and dental clinics. A radium department will be a feature of the surgical suite and hydro and electro therapeutic installations will also be added to the institution.

The appliances and accessories for use in equipping the institution will be purchased new in the United States, and when finished the Santo Tomas Hospital will undoubtedly be the finest institution, except Ancon Hospital, south of the United States, or a close second to any similar general hospital in the world.

PALO SECO LEPRO ASYLUM.

[*Mr. F. D. Tucker, Superintendent.*]

The number of cases on hand at the first of the year was 76, including two temporarily at Ancon Hospital, for treatment of diseases other than leprosy. There were 11 admissions—three from Colon, two from Gatun, one from Empire, four from Panama, and one from Juan Diaz, R. P. Three deaths occurred during the year. Two patients were paroled; these were afflicted with the nerve type of leprosy, which is considered noninfectious; they will report to the health department once every six months for examination and report as to condition. Four patients were discharged; they were in good physical condition and repeated examinations failed to show the presence of leprosy bacilli. All the patients paroled or discharged were either taken care of by their families or secured promise of employment before being discharged. Two patients who were insane and suffering from the nerve type of leprosy, were transferred to Corozal Hospital for the Insane. One patient was deported to his home in Martinique, and one to Barbados. There were 74 patients in the institution at the close of the year.

The buildings, walks, fences, etc., have been kept in good state of repair, mostly by patient labor. The interiors of several of the buildings were painted. The grounds have been generally improved, trees and hedges planted, and a new pier is being built. A new site for the institution has been surveyed on the high plateau in the rear of the present station.

A distinctive currency for use at this institution only was put into circulation; it has the advantage of preventing purchases of liquor from Panama, preventing savings for escape, and does away with the use by the general population of money which has been handled by these lepers. A savings bank was started for the patients, in which there are several depositors.

One wedding took place during the year, and the husband has built a cottage for which material was furnished. The whole station was interested in this marriage, and the moral effect is good. The

question of children was solved by a vasectomy done on the husband, upon his written request.

Farm produce from patients' gardens is coming in. We are trying to teach better farming by means of the station garden, and we have goats and the best breeds of pigs. The ideal is to have the patients raise all the food consumed.

DISTRICT DISPENSARIES.

Our district physicians have continued to care for the medical needs outside of hospital treatment, of employees, their families, ships passing through the canal, etc., in a satisfactory and efficient manner. Their services to passengers and crews of ships are constantly increasing.

DISTRICT DENTISTS.

Due to the amount of dental work required by employees and their families, a third dentist has been authorized for Ancon, who will do his work in the same office as one of the present dentists. An additional dentist has also been appointed at Colon, and part of old Colon Hospital buildings fitted up for his office. We now have a total of nine district dentists, all of whom are kept busy. They are now all on a no-salary basis.

SANITATION.

CANAL ZONE.

[Dr. D. P. Curry, Assistant Chief Health Officer in charge.]

This consists mainly in antimosquito work, although the duties of sanitary inspectors are many and varied—antirats work, antitfly work, inspection of hotels, restaurants, quarters, and barber shops, disinfections, maintenance of cemeteries, and general sanitary work. The four sanitary districts of the Zone are Ancon, Balboa, Pedro Miguel, and Gatun; their territory has not changed during the year, with the exception that the former Army post at Las Cascadas is now sanitized by our force, as this town was turned over to The Panama Canal and opened up by the supply department for silver employees of the Canal.

The beginning of the fiscal year was marked by a very high malarial rate. The undrained swamps in the neighborhood of Colon, Cristobal, and Gatun were giving off unusual swarms of *Anopheles albimanus* and *tarsimaculata*. The screens of the Washington Hotel and Colon Hospital were so thickly covered that a larvacide spray was used repeatedly as the easiest way of destroying the invaders. There was no *Anopheles* breeding nearer than the Margarita road swamp—nearly 2 miles by direct flight from the hotel, and a mile and a half from New Cristobal, with about a mile of open water of Manzanillo Bay intervening; there is very little doubt that flight took place over this distance from the swamp to the points mentioned. To have come from any other breeding place they would have had to fly a greater distance and over the full length of Colon and Cristobal, the intermediate parts of which were free from *Anopheles*. The prevailing winds at this season are variable and light.

The laborers' settlement of Camp Bierd, the coaling plant, and the dry dock, all south of Cristobal, were also heavily infected and

Anopheles were found to be coming in great numbers from the swamps of Telfers Island and the vicinity of Mount Hope. Sea-level ditches were placed in these latter swamps in order to drain the territory within a mile of the dry dock and all dairy cattle were removed beyond that area.

The Army sanitary inspector, Mr. J. B. Shropshire, made sea-level ditches in the Margarita swamp, on account of its nearness to France Field and Fort Randolph; this was drained into the bay and Coco Solo river, so that fresh water no longer gathers here and the tides reach practically all parts of it. It had previously been proposed to fill this swamp by suction dredges, pumping spoil from the sea at an estimated cost of nearly a million dollars, whereas the expedient adopted by the Army inspector cost but a few thousand dollars and will probably prove effective as a sanitary measure.

Owing to the high *Anopheles* prevalence and increased malaria rate manifested at Gatun at the beginning of the rainy season in 1919, observations were made which showed that enormous flights of mosquitoes were coming across the Canal from the swamp back of fill 3 formed by damming of water between the river dike and the spoil of the French canal, making a swamp nearly a square mile in area, the greater portion of it within a mile of Gatun locks. Experiments made by Mr. J. A. Le Prince, former chief sanitary inspector, in 1913, demonstrated flights from this swamp at a time when spoil was being pumped into it by suction dredges; but because of the nearly flat slope and luxuriant vegetation that established itself, and the tremendous precipitation of the rainy season, it appears that the swampy condition reappeared so as to permit prolific *Anopheles* breeding again. In July, 1919, work was begun in this swamp by putting a large ditch through the western part of it, with laterals toward the Canal at about 500-foot intervals, and now no water is to be found there except at its furthestmost northern extremity.

Other swamps in the vicinity of Mindi were drained and the continuity of the old French east diversion from Boca Mindi to the canal was restored by connecting the interrupted portions through a culvert under the railroad.

At Pedro Miguel extensive tile drainage was installed in the fortification clearings formerly used as cattle pastures. Owing to the difficulty of controlling *Anopheles* breeding in cattle pastures, it has been found necessary to insist more strictly upon observance of the rule promulgated in 1916 that no cattle pastures be permitted within a mile of sanitated settlements.

In the Ancon-Corozal district the outlying areas requiring maintenance by oiling and other temporary measures have been put in better condition by the construction of open ditches lined with concrete sectional half-round drains or by the installation of rock-covered concrete tile. It has been found that precast concrete drains are far cheaper than clay tile, and are equally satisfactory for all our purposes. The health department is now manufacturing all its own drains at the larvacide plant at Ancon.

In connection with the construction of the new Army camp (Fort Clayton) at Miraflores, the surface of the Cardenas river—a prolific *Anopheles* producer has been lowered 7 feet by tunnelling under the floor of the concrete railroad and wagon bridge, admitting every tide and allowing the river to reduce to a very small stream between

tides. Several large ponds also were drained or controlled in this area; the sanitation of Corozal profits thereby, as all these breeding places were close enough for flights into the residence section.

The Balboa district required no extensive construction during the year, but the large hydraulic fill north of town demands an increasing amount of attention because of unequal settling, and also because of its becoming grassed over, holding and concealing the water of the rainy season and allowing it to seep out at the margins of grassy spots so as to produce sufficient moisture on the surface for breeding. Ditches dug in the material are rapidly obliterated by the rains; also the contours change with settling, so no permanent work can as yet be attempted for its control.

The two large Army posts of permanent concrete construction will soon be completed. Each will accommodate a full regiment of infantry and both will require an extension of our sanitized areas to protect their soldier populations. Fort Clayton, at Miraflores, presents no unusual features of sanitation. The Cardenas River will have to be "trained" for some distance above the post, and there will appear the usual small streams, springs, and seepage areas to be controlled. Fort Davis, at Gatun, is not so well situated, being in close proximity to large, flat, swampy areas, in which cattle are pastured, so that quite extensive and expensive work should be done before soldiers are stationed there. From some of the nearby pastures the cattle must be removed and their hoof prints eliminated by filling or grading. It has been found impossible in our wet season frequently even in steep hill land, to drain pastures so that they will not be punched up by the feet of cattle. These hoof prints are always favorite breeding places for *Anopheles* and to control them effectively by oiling is impracticable and costly because of the difficulty of searching out and finding every one of them.

Cattle camp malaria.—In spite of the administration of quinine in 10-grain doses each night to such employees of the cattle pasture clearing camps as will accept it, the malaria rate of these camps continues high. They are largely recruited from the natives of the Republic of Panama, the greater number of whom are probably chronic carriers of the malaria organism. Living in temporary, open, thatched bunk houses, on the banks of lagoons and streams, as they hew out clearings in the virgin jungle where little sanitation is feasible, they are continually exposed to attack by hordes of mosquitoes. The best solution of the problem seems to lie in providing suitable screened buildings of a knockdown portable type if necessary, and a more routine administration of quinine as a prophylactic.

Rats and antiplague work.—Because of the presence of plague in both North and South American ports, the possibility of its introduction here is ever borne in mind. Systematic rat destruction is done in the terminal cities by poison and by traps, and all rats and mice caught or found dead (if not too badly decomposed) are sent to the Board of Health Laboratory for autopsy. No plague infection has been found in any of these. Building regulations require thorough rat-proofing of all new construction and also where extensive repairs are made upon old buildings. Rats are numerous in the jungles and pastures of the Isthmus, and it is realized that our best safeguard—

in addition to quarantine measures—lies in building the rat out of inhabited areas.

Fly breeding.—Unremitting diligence is exercised to keep the Canal Zone as free from flies as possible. Whenever flies are noticeably present a search is at once instituted for their source—usually with success. A large proportion of the ships arriving at canal ports have fly breeding aboard them. Horse manure continues to be the chief source of house flies, and many attempts have been made to devise some economical way of treating the manure so as to conserve its fertilizing value without producing flies. Composting in pits alone does not make the manure fly-proof. In properly constructed and protected pits the primary infection (which occurs here immediately after the dropping of the manure) is entirely killed in a few days. Prolonged retention in the pit renders it somewhat less attractive than fresh manure to the flies, but it has been definitely shown that manure composted even as long as six months in a tight receptacle will become blown on exposure. Possibly if some way of introducing air (oxygen) into the mass while composting could be devised, the manure would cure to a state not attractive to the fly, but the manure of this country, due to the great amount of green feed used, contains considerable liquid, so that the compost pit acts in reality as a silo in preserving manure for long periods. The method now in use is to remove the manure from the pits at any time it may be needed after 15 days composting, mixing it thoroughly with an equal quantity of fresh earth, and spreading at once upon the ground or using as a top dressing 3 inches thick. No fly breeding is found in manure so treated. Some of the Chinese gardeners use borax with success, but they require constant watching.

PANAMA HEALTH OFFICE.

[Dr. H. Goldthwaite, Health Officer.]

Malaria.—The following table shows the malaria cases reported for the six past fiscal years:

1920.....	128
1919.....	142
1918.....	108
1917.....	226
1916.....	304
1915.....	1, 582

The population has increased a few thousand in this period, so that the reduction in percentage of cases to total population would be even more marked than the above. Referring to the figures for the year 1920, 115 of these cases were reported during the last six months of 1919, and 13 only for the first six months of the calendar year 1920. The number of malaria cases chargeable to the city of Panama shows a small improvement over the report for 1919; this may be due, in part, to a more thorough cleaning of the ditches under the supervision of this office, but is most likely the result of the more intensive work done in the contiguous territory. It hardly seems possible that malaria could originate within the area sanitated by this office, as all ditches are not only kept clean, but are regularly swept thoroughly, and knowing that *Anopheles* will fly at least one mile, it is reasonable to presume that they exceed this limit—as

pointed out in remarks under Zone sanitation, the few cases charged to the city of Panama could easily be accounted for as being infected by mosquitoes coming from the known infected area beyond the 1-mile circle. To repeat what has been said in previous annual reports, the serious problem confronting us regarding malaria in Panama and vicinity, is that portion of the environment of the city known as Las Savanas. The eastern portion of the city, that which is generally known as the Calidonia district, can probably not be kept entirely free from malaria as long as the Savanas country remains unsanitized.

Vaccinations and smallpox.—For the year ending June 30, 1920, 16,256 vaccinations were made by this office. Until vaccination has been done thoroughly throughout the Republic, we will always have some cases of smallpox appearing in the city of Panama from time to time.

Milk.—During the year practically all of the milk producers in the city and its environs formed a central milk distribution plant and it is now operating satisfactorily. All milk is now pasteurized and sold in sanitary milk bottles. The laboratory analyses of the Panama milk show a very marked improvement in the condition and grade of milk sold here.

Veterinary and meat inspection work.—The new slaughterhouse the city of Panama was put into operation May 29, 1920. All cattle and swine are now slaughtered in the new location. The fees for the quarantine inspection of cattle and swine for the year totaled \$4,424.90.

Sanitary inspection.—The usual routine work has been done by the inspectors attached to this office. The streets are in good condition. The night collection of garbage proceeds satisfactorily with practically no overtime charges for motor-car service—a condition much more satisfactory than heretofore in vogue.

A new system of inspection of the sanitary districts was instituted during the year, which has worked most satisfactorily; it consists in making each man connected with the inspection work responsible for the work done by him; that is to say, the inspector is completely responsible for his district; the foreman is responsible to the inspector and the laborers are given tasks—so many city squares to work—they, in turn, being responsible to the foreman. This method has resulted in a much cleaner city, and at less expense.

Fines.—There were 1,147 fines imposed for violation of sanitary regulations, and \$2,720 collected as a result thereof.

COLON-CRISTOBAL HEALTH OFFICE.

[Dr. J. L. Byrd, Health Officer.]

Malaria.—The number of cases reported during the year was 223, as against 177 last year. The increase in the number reported was due to conditions on Mindi Island during July, 1919, 117 cases being reported during that month. A large amount of ditching, draining, etc., has now been done on Mindi Island, eliminating many *Anopheles* breeding places. The fill between New Cristobal and Colon is almost completed, doing away with a swampy area that has caused the department a large yearly expense in labor and material in keeping down the breeding of flies and mosquitoes. A large number of ditches have been constructed in the Mount Hope area, which greatly reduces the *Anopheles* breeding area. This district has been

gone over thoroughly during the year, and is now in better shape than it has ever been, and should cause the department less expense in the future. Quinine tonic is offered daily to all men exposed to mosquitoes at Mount Hope, dry dock, and Mindi Island.

Tuberculosis.—There were 96 cases reported during the year, as compared with 133 last year.

Since the strike in February and March, many families have been found destitute, and relief was furnished by charitable organizations. Several were assisted financially, as well as being furnished food and clothing. Many were sent to the hospital for treatment.

Whooping cough.—In October, 1919, school opened and children with whooping cough were found in school; 50 cases developed during October and November.

Measles.—In January, 1920, there were no known cases of measles in the city, except one from the States. About the middle of the month measles developed among the school children, becoming an epidemic; there were 72 cases reported from that time to the end of March, and some were found in Colon which had not been reported or treated by a physician. Daily visits were made to Cristobal school and kindergarten, and the children in the grades where there had been cases of measles, were examined; those with temperatures of over 99.4 were kept home four days.

Infant welfare.—Several cases of malnutrition were reported by teachers, which were investigated and found in destitute circumstances. Milk and food were furnished for several weeks to the children, and the mothers were instructed in the preparation and selection of nourishing food. The cases were brought to the notice of relief societies.

These cases brought attention to the need of a clinic for nonemployees—nearer than Santo Tomas Hospital in Panama—where minor dressings, medical treatment, and advice and instructions about the care of children could be obtained free. Two physicians in Colon have offered their services free of charge for such a clinic, and the Red Cross is arranging to ship a portable building to Colon in which to house the clinic. Especially are instructions needed for tubercular cases, and advice against the use of patent medicines.

Building operations.—There were 1,005 permits given to repair buildings; 36 permits to build, and 40 buildings condemned. About half of the new Panama Railroad stables on G and Sixteenth Streets have been completed and are occupied; the remaining half will be ready for occupancy within the next two months, which will allow the demolishing of the old stables on E Street, thereby doing away with one of the worst fly and rat breeding places in Colon.

There has been quite a marked increase in the last month in the number of new buildings proposed, and with the opening of the new residential addition to Colon, between Seventh and Ninth and G and K Streets, building operations will still further increase. The old private stables on Ninth Street, about 10 in number, have been demolished and removed, and the larger part of the space occupied by them has been filled, doing away with another one of the most insanitary places in Colon. The wooden floor of the old Royal Mail dock was replaced by a new concrete floor, and a new roof was put on, making it practically a new rat-proof dock. Old Dock 11 has been partly demolished. This work should be completed as soon as possible, as it is one of the worst rat harborages in Cristobal.

Streets and alleys.—The cleaning of alleyways by the health office has been discontinued, and each property owner is now held responsible for the sanitary condition of the alleyway north of his property. For the first few months it was difficult to accustom these people to the change, although little opposition was encountered: conditions are gradually becoming better and the alleyways are now as clean and sanitary as can be expected considering the class of tenants occupying the buildings.

The concrete streets in Colon are in excellent condition, and are cleaned daily by the health office force. The concreting of G Street was completed during May, and the streets in the new fill back of that street were also completed. Broadway and Seventh Streets should be concreted, which would relieve the balance of the unconcreted streets from considerable traffic, thereby making it easier to sanitate.

Garbage.—On October 17, 1919, it was necessary to abolish the old dump back of Colon, on account of the New Cristobal fill. The long haul to the new dump west of Mount Hope has added considerable to the transportation expense. The old horses and mules of the supply department are practically worn out and can do only half service. This kind of transportation should be replaced by motor transportation which would make a big reduction in expense. It is expected to put motor trucks in operation as soon as the new incinerator is in operation.

Veterinary work and meat inspection.—The antemortem, post-mortem, and quarantine inspection of animals arriving in port or slaughtered at Colon and Cristobal, has been carried out in the usual thorough manner.

Several cases of anthrax were reported during the dry season, but with the present efficient force of veterinarians it is impossible for any infected meat to escape their notice. Splenic smears are taken from every animal slaughtered and immediately examined. The ear of each animal that dies in pasture is sent to the board of health laboratory for examination.

QUARANTINE.

[*Surgeon S. B. Grubbs, U. S. P. H. S., Chief Quarantine Officer.*]

During the year inspection trips were made by the chief quarantine officer and by the quarantine officer, Cristobal-Colon, as shown below, in order to secure first hand information as to the sanitary condition of the various ports, and to relieve passengers, shipping, and The Panama Canal of as much quarantine delay as may be safely done away with. These inspections should be made about once in six months, and at such special times as may be necessary. It is expected that with the cooperation of our consular representatives, the international health board, and the shipping interests, great saving in time to ships and passengers will be effected.

As a result of a recent trip to the west coast of Central America, by the chief quarantine officer, certain modifications were made in our requirements at La Union, San Salvador, and Corinto, Nicaragua; modifications will also be made in the restrictions against Punta Arenas, Costa Rica, as soon as certain antimosquito work has been accomplished.

After an inspection of the ports on the Atlantic side of Colombia and of the ports on the Magdalena River for a distance of 70 miles, the quarantine officer, Cristobal-Colon, recommended that inasmuch as no yellow fever had been known to originate in or near this area for over 12 years the six-day quarantine be lifted: this was approved and put into effect June 25, 1920.

The fumigation of all vessels from the west coast of South America, which discharge their cargo at a Canal Zone port, has been continued; they are fumigated, empty, once every three months, for the destruction of rats. Both sulphur and cyanide are used, and the results have been very satisfactory. The steamship companies have given hearty cooperation and realize the value of this measure, not only as a protection to the public health, but as saving many claims for cargo damaged by rats.

On account of the unsatisfactory plague situation at Paita, Peru, the fumigation separately, on arrival at Cristobal, of all cargo lifted at this port, was instituted June 22, 1920, as an added precaution. Also, in following the routine fumigation every three months, especial attention is given to vessels touching at this port.

Quarantine inspection of incoming ships from "clean" ports, up to 10 o'clock at night, which was instituted at Cristobal last year, was started at Balboa on February 16, 1920; up to June 30, 1920, but nine ships had availed themselves of this privilege at Balboa. During the year 203 ships were inspected at night at Cristobal.

IMMIGRATION INSPECTION.

The quarantine service is charged with the enforcement of the immigration laws of the Canal Zone and of the Republic of Panama, aided in certain specific instances (American seamen and Chinese) by the customs bureau. The quarantine medical officer in the United States simply certifies as to the physical and mental state of the immigrant, while here his financial condition and general desirability must also be decided by our physician.

While immigration, especially of the laboring class, has greatly decreased in recent years owing to the completion of the canal, the opening of the canal and the consequent increasing number of vessels using it have brought additional duties to the quarantine officers in the handling of the many deserters who are a natural result of the Isthmus, being the first stop in a long voyage.

On the arrival of a vessel the passenger list is examined, and those who state that their coming to the Isthmus is merely one part of their journey, as well as those who signify that their wish is to make this place their home, are questioned as to their financial standing and then subjected to a medical examination, more or less elaborate according to circumstances.

The law requires all intending to become residents to be vaccinated; this is done if it has not already been successfully performed at the port of embarkation or en route. The passenger is rapidly scrutinized for any gross physical defects, examined particularly for trachoma, favus, and syphilis, as well as the infectious diseases, and is asked a sufficient number of questions to form some judgment as to his mental condition. Those about whom any suspicion exists are detained and subjected to a more complete examination at the quarantine station. Those found deficient are refused admission and deported by order of the quarantine officer.

It is hoped that a change will be made regarding the decision by the United States immigration authorities refusing entry to certain sailors previously removed from United States vessels at the canal for medical treatment, when these sailors are aliens, notwithstanding their having been signed on at a United States port.

EXPENSES.

The total maintenance and operating expenses of the department, and credits received, have been as follows:

	1920			1919		
	Total expenses.	Credits. ¹	Net expenses.	Total expenses.	Credits.	Net expenses.
Administration.....	\$22,281.37	.....	\$22,281.37	\$20,516.68	\$6.00	\$20,510.68
Division of hospitals and charities.....	920,613.77	\$468,000.00	451,613.77	776,762.88	412,981.95	363,780.93
Sanitation (Zone and two terminal cities).....	443,760.49	110,090.09	313,760.49	402,391.62	128,374.25	274,017.37
Quarantine.....	90,375.39	42,000.00	48,375.39	65,896.04	49,744.39	16,151.65
Total.....	1,477,031.02	641,000.00	836,031.02	1,265,567.22	591,106.59	674,460.63

¹ Approximately.

Owing to the constantly increasing cost of labor, materials, and supplies, and the failure of Congress to appropriate more than \$850,000, it has been necessary to increase the hospital charges, to make a flat charge against the Panama Railroad for treatment of its employees, and to greatly reduce our sanitary force, in order to keep within our appropriation.

Respectfully submitted.

H. C. FISHER,
Chief Health Officer.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal, Balboa Heights, Canal Zone.

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TABLE I.—DISCHARGES, DEATHS, AND NONEFFECTIVE RATES FOR EMPLOYEES.

(The figures for 1918-19 do not agree with those shown in the report for that fiscal year, but have been changed to the same basis as those for 1919-20.)

ABSOLUTE NUMBERS.

Color.	Average number of employees.	Discharges from hospitals and deaths.			Deaths.			Noneffective from sickness.	
		Total.	Disease.	External causes.	Total.	Disease.	External causes.	Days treated.	Constantly non-effective.
Year 1919-20:									
White.....	4,447	1,439	1,277	162	19	15	4	29,398	80.54
Colored.....	17,269	3,462	2,903	559	187	161	26	88,298	241.91
Total.....	21,716	4,901	4,180	721	206	176	30	117,696	322.45
Year 1918-19:									
White.....	3,738	1,161	1,068	93	10	9	1	27,413	75.10
Colored.....	16,434	3,596	3,049	547	160	144	16	96,919	265.53
Total.....	20,172	4,757	4,117	640	170	153	17	124,332	340.34

PROPORTIONATE NUMBERS.

Year 1919-20:									
White.....	4,447	323.59	287.16	36.43	4.27	3.37	.90	.....	18.11
Colored.....	17,269	200.47	168.10	32.37	10.83	9.32	1.51	.....	14.01
Total.....	21,716	225.69	192.48	33.20	9.49	8.10	1.38	.....	14.85
Year 1918-19:									
White.....	3,738	310.59	285.71	24.88	2.67	2.41	.27	.....	20.09
Colored.....	16,434	218.81	185.55	33.28	9.74	8.76	.98	.....	16.16
Total.....	20,172	235.82	204.09	31.73	8.43	7.58	.84	.....	16.87

TABLE I-A.—DEATHS IN THE CANAL ZONE AND THE CITIES OF PANAMA AND COLON.

	Average population.	Deaths.			Annual average per 1,000.		
		Total.	Disease.	External causes.	Total.	Disease.	External causes.
Year 1919-20:							
Panama.....	61,369	1,278	1,234	44	20.82	20.11	0.72
Colon.....	26,078	567	527	40	21.74	20.21	1.53
Canal Zone.....	30,954	253	219	34	8.17	7.08	1.10
Total.....	118,401	2,098	1,980	118	17.72	16.72	1.00
Year 1918-19:							
Panama.....	61,369	1,377	1,341	36	22.43	21.85	.59
Colon.....	26,078	636	607	29	24.37	23.28	1.12
Canal Zone.....	21,707	218	204	14	10.04	9.40	.64
Total.....	109,154	2,231	2,153	79	20.44	19.72	.72

TABLE III.—DEATHS BY NATIONALITY OR NATIVITY.

Country.	Em- plo, ees.	Non- em- plo, ees.	Total.
Africa.....		1	1
Algeria.....		1	1
Austria.....		1	1
Antigua.....	2	15	17
Bahamas.....	1	2	3
Barbados.....	39	303	342
Brazil.....		1	1
British Guiana.....	1	6	7
Canada.....		1	1
Chile.....		3	3
China.....	1	41	42
Colombia.....	11	94	105
Costa Rica.....	1	8	9
Cuba.....		1	1
Curacao.....		1	1
Demerara.....		6	6
Denmark.....	1	1	2
Dominica.....		3	3
Ecuador.....	1	13	14
England.....		5	5
Finland.....		1	1
Fortune Island.....	1	4	5
France.....	2	11	13
Germany.....		2	2
Grand Cayman Island.....		2	2
Greece.....	1	5	6
Grenada.....	4	26	30
Guadeloupe.....	7	11	18
Guatemala.....	1		1
Haiti.....	2		2
Holland.....		1	1
Honduras.....		3	3
Hungary.....	1		1
India.....		5	5
Ireland.....		1	1
Italy.....	1	10	11
Jamaica.....	61	486	547
Japan.....		4	4
Martinique.....	5	36	41
Mexico.....	2	5	7
Montserrat.....		7	7
Nassau.....		6	6
Nicaragua.....	1	3	4
Norway.....	1		1
Panama.....	27	583	610
Peru.....	2	20	22
Porto Rico.....		5	5
Roumania.....		1	1
Scotland.....		2	2
Spain.....	2	34	36
St. Andrews.....	1		1
St. Lucia.....	6	32	38
St. Thomas.....	3	6	9
St. Vincent.....	2	7	9
Sweden.....		2	2
Trinidad.....	3	15	18
United States.....	11	42	53
Venezuela.....	1	7	8
Total.....	206	1,892	2,098

TABLE IV.—DEATHS OF EMPLOYEES, BY COLOR, AGE, AND LENGTH OF RESIDENCE, ON ISTHMUS.

Cause of death.	Color.		Age (in years).										Length of residence on Isthmus (in years).										To- tal.			
	W.	B.	15-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-65	66-75	Un- known.	Un- der 1 yr.	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-10		10-15	Over 15	Life.	Un- known.
General diseases:																										
Malaria fever.....	1	2	1	2	1	1	1	1	1	1	1	1				1							1	1	8	1
Influenza.....	2	19	2	5	5	3	2	2	1	1						1							1	4	1	1
Dysentery.....		1																					1			
Pyæmia.....	1	1				1	1																			
Septicæmia.....																										
Tetanus.....																										
Tuberculosis of the lungs.....	23		1	4	2	11	3	1	1	1	1						1						1	2	4	4
Acute military tuberculosis.....		1						1	1																	
Chronic military tuberculosis.....		1																								
Potter's disease.....	3					1	1																			
Disseminated tuberculosis.....	3					2	1																	1	1	1
Syphilis tertiary.....	2					2	1																	2	1	1
Syphilis period not stated.....	2					1																		1	1	1
Cancer of the stomach.....	1	1		1								1	1													
Cancer of organs not speci- fied.....																										
Purpura hæmorrhagica.....	2					1						1				1							1	1		1
Chronic lead poisoning.....	1			1																						
Diseases of the nervous system and of the organs of special sense:																										
Encephalitis.....	1															1							1			1
Simple meningitis.....	1			1																				1		1
Pneumococcus meningitis.....	2						1																			1
Cerebral hæmorrhage (ap- oplexy).....	7			1				1	2	3	1												1	2	1	3
Softening of the brain.....	1	2							1		2												1	1		2
General paralysis of the insane.....	1																									1
Diseases of the circulatory system:																										
Acute endocarditis.....	2					1																	1			1
Malignant endocarditis.....	2					1																	1	1		2
Organic diseases of the heart.....	1	9		1	2	2	2	2	1	1	2												8	2	1	10
Aneurysm.....	4					2	1				1												1			1
Arterio-sclerosis.....	1	1									1												1	1		1
Embolism and thrombosis.....	1																									1

TABLE IV.—DEATHS OF EMPLOYEES, BY COLOR, AGE, AND LENGTH OF RESIDENCE, ON ISTHMUS—Continued.

Cause of death.	Color.		Age (in years).										Length of residence on Isthmus (in years).										Total.		
	W.	B.	15-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-65	66-75	Un- known.	Un- der 1 yr.	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-10		10-15	Over 15	Un- known.
Diseases of the respiratory system:																									
Acute bronchitis.....	1	1			1		2		1			1										1	1	1	1
Broncho-pneumonia.....	5	2			1		1		1													1	1	1	1
Pneumonia (unqualified).....	18		5	4	1	2	1	2	1	2									1	1		4	2	8	1
Lobar pneumonia.....	1		1																						1
Gangrene of the lungs.....																									1
Diseases of the digestive system:																									
Ulcer of the stomach.....	1				1														1						1
Acute gastritis.....	1						1																		1
Diarrhea and enteritis.....	1				1																	1			1
Acute appendicitis.....	1								1																1
Hernia, intestinal obstructions.....	2				2															1					1
Inguinal hernia.....	1										1														1
Other hernias.....	1								1																1
Intestinal obstruction.....	1			1																					1
Duodenal ulcer.....	1																								1
Cirrhosis of the liver.....	2			1				1															1		1
Diseases of the spleen.....	1				1																				1
Simple peritonitis.....	1						1																1		1
Nonvenereal diseases of the genito-urinary system:																									
Acute nephritis.....	1						1																		1
Chronic nephritis.....	2	17		6	3	1	4	1	2	1			1					1	1			3	9	1	1
Diseases of the bladder.....	1						1																		1
Diseases of the skin and of the cellular tissue:																									
Acute abscess.....	1																								1
Phlegmon and cellulitis.....	1			1																					1
Diseases of the bones and of organs of locomotion:																									
Arthritis.....	1			1																					1
Ill-defined diseases:																									
Ill-defined or not specified.....	1	5		1		1	2	2										1					2	1	1

Affections produced by external causes:	19	187	7	27	35	40	27	23	19	11	11	5	1	2	1	8	1	3	5	8	15	18	61	19	27	38	206
Suicide by firearms.....	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Burns.....	4	4	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Accidental drowning.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trammatism by cutting or piercing instruments.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trammatism by fall.....	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trammatism by machines.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Trammatism by crushing.....	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Railroad trammatism.....	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Homicide by cutting or piercing instruments.....	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	1	6
Other external violence.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	19	187	7	27	35	40	27	23	19	11	11	5	1	2	1	8	1	3	5	8	15	18	61	19	27	38	206

TABLE V.—STATISTICS RE AMERICAN EMPLOYEES AND THEIR FAMILIES.

	Annual average per 1,000.
White employees from the United States:	
Disease.....	2.06
External causes.....	.77
Total.....	2.83
White women and children from the United States:	
Disease.....	3.32
External causes.....	.39
Total.....	3.71
White employees and their families from the United States:	
Disease.....	2.78
External causes.....	.55
Total.....	3.33

TABLE VI.—CONSOLIDATED HOSPITAL REPORT.

[A, White Americans. F, White foreigners. B, Black.]

	Remaining July 1, 1919.			Admitted.			Died.		
	A.	F.	B.	A.	F.	B.	A.	F.	B.
Ancon Hospital:									
Employees.....	31	12	170	974	175	3,163	8	3	127
Army and Navy.....	56			760			5		
Panama pay patients.....					1	8			1
Other pay patients.....	39	33	76	1,540	1,097	1,836	18	26	147
Charity patients.....	9	3	16	312	63	340	3	3	20
Total.....	135	48	262	3,586	1,336	5,347	34	32	295
Corozal Hospital:									
Employees.....	1	1	19	2	1	13			
Army and Navy.....				19					
Panama pay patients.....	3	53	216		19	34		5	15
Other pay patients.....		4	12	5	4	16		1	2
Charity patients.....		10	71	2	3	13		1	7
Total.....	4	68	318	28	27	76		7	24
Grand total.....	139	116	580	3,614	1,363	5,423	34	39	319
Corozal Farm (cripples) employees.....		9	45		2	11			
Chronic ward: Charity patients.....			29			4			
Colon Hospital:									
Employees.....	6	1	15	305	48	740	2		34
Army and Navy.....	6	2		88	10		4	1	
Panama pay patients.....			1	5	21	96		3	17
Other pay patients.....	11	5	8	427	331	460	8	14	27
Charity patients.....	4			62	8	55	1		
Total.....	27	8	24	887	418	1,351	15	18	78
Palo Seco Leper Asylum:									
Panama pay patients.....		2	41		2	3			2
Charity patients.....			31		1	7			1
Total.....		2	72		3	10			3
Grand total:									
Employees.....	38	23	249	1,281	226	3,927	10	3	161
Army and Navy.....	62	2		867	10		9	1	
Panama pay patients.....	3	55	258	5	43	141		8	35
Other pay patients.....	50	42	96	1,972	1,432	2,312	26	41	176
Charity patients.....	13	13	147	376	75	419	4	4	28
Total.....	166	135	750	4,501	1,786	6,799	49	57	400

TABLE VI.—CONSOLIDATED HOSPITAL REPORT—Continued.

	Discharged.			Transferred.			Remaining June 30, 1920.		
	A.	F.	B.	A.	F.	B.	A.	F.	B.
Ancon Hospital:									
Employees.....	969	172	2,993	4	4	50	24	8	163
Army and Navy.....	771			10			30		
Panama pay patients.....					1	7			
Other pay patients.....	1,499	1,078	1,679	5	1	30	57	45	56
Charity patients.....	315	59	290		2	33	3	2	13
Total.....	3,554	1,289	4,962	19	8	120	114	55	232
Corozal Hospital:									
Employees.....	3	1	18					1	14
Army and Navy.....	17						2		
Panama pay patients.....		6	48			5		61	182
Other pay patients.....	3	3	10				2	4	16
Charity patients.....	2	3	24		1	2		8	51
Total.....	25	13	100		1	7	7	74	263
Grand total.....	3,579	1,302	5,062	19	9	127	121	129	495
Corozal Farm (cripples) employees.....		7	29					4	27
Chronic ward: Charity patients.....			3			4			26
Colon Hospital:									
Employees.....	247	32	350	58	17	355	4		16
Army and Navy.....	57	6		32	5		1		
Panama pay patients.....	1	2	20	4	16	59			1
Other pay patients.....	325	187	290	95	126	134	10	9	17
Charity patients.....	59	8	44	4		10	2		1
Total.....	689	235	704	193	164	558	17	9	35
Palo Seco Leper Asylum:									
Panama pay patients.....			5					4	37
Charity patients.....			5					1	32
Total.....			10					5	69
Grand total:									
Employees.....	1,219	212	3,390	62	21	405	28	13	220
Army and Navy.....	845	6		42	5		33		
Panama pay patients.....	1	8	73	4	17	71	3	65	220
Other pay patients.....	1,827	1,248	1,979	100	127	164	69	58	89
Charity patients.....	376	70	366	4	3	49	5	11	123
Total.....	4,268	1,544	5,808	212	173	689	138	147	652

TABLE VII.—CONSOLIDATED REPORT OF EMPLOYEES TREATED IN QUARTERS.

Station.	Remaining July 1, 1919.		Admitted.		Died.		Discharged.		Transferred.		Remaining June 30, 1920.	
	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.
Ancon.....	4	8	1,924	1,732			1,800	1,664	32	63	6	13
Balboa.....	3	1	2,364	22			2,358	23			9	
Petro Miguel.....	2	3	204	209			199	202	5	7	2	3
Gatun.....	2	3	192	99			184	92	10	10		
Cristobal.....	2	32	1,119	1,675			1,093	1,648	22	42	6	17
Total.....	13	47	5,803	3,737			5,724	3,629	69	122	23	33

TABLE VII-A.—CONSOLIDATED REPORT OF DAYS LOST IN QUARTERS.

Station.	White.	Colored.	Total.
Ancon.....	4,564	5,366	9,930
Balboa.....	5,158	99	5,257
Pedro Miguel.....	595	522	1,117
Gatun.....	585	418	1,003
Colon.....	3,219	11,688	14,907
Total.....	14,121	18,093	32,214

TABLE VIII.—CONSOLIDATED HOSPITAL AND EMPLOYEES TREATED IN QUARTERS REPORT.

	Remaining July 1, 1919.		Admitted.		Died.		Discharged.		Transferred.		Remaining June 30, 1920.	
	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.
Hospitals.....	301	750	6,287	6,799	106	400	5,812	5,808	385	689	285	652
Quarters.....	13	47	5,803	3,737	.....	.....	5,721	3,629	69	122	23	33
Total.....	314	797	12,090	10,536	106	400	11,536	9,437	454	811	308	685

	White.	Colored.	Total.
Total admissions to hospitals, excluding Corozal farm and chronic ward.....	6,285	6,784	13,069
Total admissions of employees to quarters.....	5,803	3,737	9,540
Total admissions to hospitals and quarters.....	12,088	10,521	22,609
Less number of patients transferred from quarters to hospitals and between hospitals, whose admissions are duplicated in above figures.....	385	685	1,070
Net admissions to hospitals and quarters.....	11,703	9,836	21,539
Total admissions of employees to quarters.....	5,803	3,737	9,540
Total admissions of employees to hospitals.....	1,507	3,927	5,434
Total admissions of employees.....	7,310	7,664	14,974
Less number transferred between hospitals, etc.....	152	523	675
Net admissions of employees to hospitals and quarters.....	7,158	7,141	14,299
Annual average per 1,000 admissions of employees.....	1,609.62	413.52	658.45

TABLE VIII-A.—CONSOLIDATED DISPENSARY REPORT OF ALL CASES TREATED BUT NOT EXCUSED.

Station.	Employees.			Nonemployees.			Total.		
	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.
Ancon.....	14,246	59,272	73,518	12,008	19,211	31,219	26,254	78,483	104,737
Balboa.....	52,187	28,409	80,596	39,186	13,864	53,050	91,373	42,273	133,646
Pedro Miguel.....	11,549	31,181	42,730	18,434	26,734	45,168	29,983	57,915	87,898
Gatun.....	4,070	21,404	25,474	6,522	10,089	16,611	10,592	31,493	42,085
Cristobal.....	12,901	50,861	63,762	14,153	21,088	35,241	27,054	71,949	99,003
Total.....	94,953	191,127	286,080	90,303	90,986	181,289	185,256	282,113	467,369

TABLE IX.—AVERAGE NUMBER OF EMPLOYEES CONSTANTLY SICK IN HOSPITALS AND QUARTERS.

	White.	Colored.	Total.
HOSPITALS.			
Ancon Hospital.....	37.51	179.45	216.96
Colon Hospital.....	4.35	12.89	17.24
Total.....	41.86	192.34	234.20
QUARTERS.			
Ancon.....	12.50	14.70	27.20
Balboa.....	14.13	.27	14.40
Pedro Miguel.....	1.63	1.43	3.06
Gatun.....	1.60	1.15	2.75
Cristobal.....	8.82	32.02	40.84
Total.....	38.68	49.57	88.25

TABLE IX-A.—AVERAGE NUMBER OF EMPLOYEES CONSTANTLY SICK.

	White.	Colored.	Total.
Hospitals.....	41.86	192.34	234.20
Quarters.....	38.68	49.57	88.25
Total.....	80.54	241.91	322.45

TABLE IX-B.—AVERAGE NUMBER OF EMPLOYEES CONSTANTLY SICK PER 1,000.

	White.	Colored.	Total.
Hospitals.....	9.41	11.14	10.78
Quarters.....	8.70	2.88	4.06
Total.....	18.11	14.02	14.84

TABLE X.—AVERAGE NUMBER OF DAYS' STAY IN HOSPITALS OR QUARTERS FOR EACH ADMISSION OF SICK EMPLOYEE.

	White.	Colored.	Total.
HOSPITALS.			
Ancon Hospital.....	12.17	18.89	17.15
Colon Hospital.....	7.19	5.88	5.73
QUARTERS.			
Dispensary carried by—			
Ancon.....	2.45	3.34	2.76
Balboa.....	2.17	2.38	2.20
Pedro Miguel.....	2.86	3.42	3.05
Gatun.....	2.91	4.06	3.41
Colon.....	2.92	6.68	5.20

TABLE XI.—SURGICAL OPERATIONS PERFORMED.

	Ancon Hospital.		Colon Hospital.		Total.	
	Number.	Died.	Number.	Died.	Number.	Died.
Amputations.						
Arm.....			1		1	
Forearm.....			2	1	2	1
Hand.....			2		2	
Leg.....			3		3	
Foot.....	1				1	
Thigh.....	4	1	3	3	7	4
Digits multiple.....	17		4		21	
Operation on bones.						
Osteotomy.....	4				4	
Cranectomy* decompressive.....	2	1	4	4	6	5
Cranectomy, exploratory.....			2	2	2	2
Resection of hip.....	1				1	
Resection of elbow.....	1				1	
Wiring of fractures, simple.....	14				14	
Wiring of fractures, compound.....			2		2	
Plating of fractures, simple.....	3				3	
Bone transplantation.....	3				3	
Excision of maxilla.....	1				1	
Lane plate, tibia.....	2				2	
Lane plate, humerus.....			1		1	
Lane plate, radius.....	1				1	
Bunion excision, double.....	2		1		3	
Reduction of fractures.....	3				3	
Adenectomy.						
Cervical.....	17				17	
Axillary.....	4				4	
Inguinal, single.....	232		5		237	
Inguinal, double.....	43				43	
Femoral.....	20				20	
Herniotomy.						
Inguinal, single.....	111		34		145	
Inguinal, double.....	26		3		29	
Combined.....			1		1	
Femoral.....	3		1		4	
Diaphragmatic.....	1				1	
Ventral.....	27		2		29	
Strangulated.....	5	2	2		7	2
Genito-urinary tract.						
Nephrectomy.....	3				3	
Nephrotomy.....	3		1		4	
Ureterotomy.....	1				1	
Cystotomy.....	5				5	
Urethrectomy, internal.....	12				12	
Urethrotomy, external.....	15	1	3		18	1
Prostatectomy.....	4	1			4	1
Varicocele, radical cure.....	21		1		22	
Hydrocele, single, radical cure.....	32		5		37	
Hydrocele, double, radical cure.....	6				6	
Orchiectomy.....	7				7	
Epididymotomy.....	55		1		56	
Vasectomy.....	2				2	
Amputation of scrotum.....	15				15	
Amputation of penis.....	2				2	
Curetage uteri.....	236		8		244	
Cautery of chancreoids.....	45				45	
Circumcision.....	228				228	
Perineoplasty.....	24		1		25	
Trachelorrhaphy.....	10		2		12	
Vaginal punctures.....	5				5	
Obstetrical.						
Accouchement force.....	4		6	2	10	2
Cæsarian section, abdominal.....	5	2			5	2
High forceps.....	1		2		3	
Low forceps.....	6		6		12	
Version.....	4		4		8	
Perineorrhaphy.....	25				25	
Abdominal pregnancy.....	1				1	
Thorax.						
Thoracotomy.....	6		1		7	
Excision of breast.....	1		1		2	
Excision of breast and axilla.....	4				4	
Rectum.						
Hemorrhoids, radical cure.....	112		4		116	
Fistula in anus, excision of.....			1		1	
Prolapse rectum, radical cure.....	1				1	

TABLE XI.—SURGICAL OPERATIONS PERFORMED—Continued.

	Ancon Hospital.		Colon Hospital.		Total.	
	Number.	Died.	Number.	Died.	Number.	Died.
General.						
Thyroidectomy.....	8	1	1	.....	9	1
Neuromorrhaphy.....	1	.....	.....	.....	1	.....
Nerve stretching.....	2	.....	.....	.....	2	.....
Varicose veins, excision of.....	13	.....	2	.....	15	.....
Tenorrhaphy.....	1	.....	1	.....	2	.....
Excision of surface neoplasms.....	7	.....	1	.....	8	.....
Stab wounds of soft parts, operation for.....	.....	.....	1	.....	1	.....
Extensive injuries to soft parts, operation for.....	3	.....	.....	.....	3	.....
Plastic operation for congenital defects.....	4	.....	1	.....	5	.....
Plastic operations for severe injuries.....	3	1	6	.....	9	1
Plastic operation for effects of disease.....	7	.....	3	1	10	1
Skin graft.....	3	.....	.....	.....	3	.....
Salvarsan injections.....	229	.....	.....	.....	229	.....
Arsphenamine, intravenous.....	2,388	.....	.....	.....	2,388	.....
Cauterizations.....	124	.....	.....	.....	124	.....
Laparotomy.						
For general peritonitis.....	1	.....	.....	.....	1	.....
For tuberculous peritonitis.....	3	.....	1	1	4	1
Exploratory.....	25	1	4	.....	29	1
Intestinal obstruction.....	3	1	.....	.....	3	1
Partial gastrectomy.....	1	.....	.....	.....	1	.....
Entero-enterostomy.....	1	1	.....	.....	1	1
Gastro-enterostomy.....	4	.....	.....	.....	4	.....
Enterorrhaphy.....	1	.....	1	.....	1	.....
Enterectomy.....	1	.....	.....	.....	1	.....
Appendectomy.....	156	.....	32	.....	188	.....
Appendectomy with local peritonitis.....	12	.....	20	1	32	1
Appendectomy with general peritonitis.....	10	1	8	.....	18	1
Abscess of liver.....	3	.....	2	1	5	1
Cholecystotomy.....	17	.....	1	.....	18	.....
Cholecystostomy.....	3	.....	1	.....	4	.....
Cholecysto-omy.....	1	.....	.....	.....	1	.....
Cholecystectomy.....	7	.....	3	.....	10	.....
Pan-hysterectomy.....	.....	.....	2	.....	2	.....
Supravaginal hysterectomy.....	39	.....	7	2	46	2
Hysteromyomectomy.....	32	.....	.....	.....	32	.....
Myomectomy.....	2	.....	1	.....	3	.....
Salpingectomy, single.....	14	.....	5	.....	19	.....
Salpingectomy, double.....	5	.....	11	.....	16	.....
Salpingo-oophorectomy.....	28	1	14	1	42	2
Ovarian cystectomy.....	11	.....	2	.....	13	.....
Oophorectomy.....	6	.....	3	.....	9	.....
Suspensio-uteri.....	85	.....	13	.....	98	.....
Hemato-peritoneum.....	1	.....	.....	.....	1	.....
Plastic operation for chronic peritonitis.....	.....	.....	2	.....	2	.....
Rupture of liver.....	1	.....	.....	.....	1	.....
General peritonitis.....	2	.....	.....	.....	2	.....
Ectopic gestation.....	7	1	5	.....	12	1
Stab wound of the abdomen.....	.....	.....	2	2	2	2
Gunshot wound of abdomen.....	.....	.....	1	1	1	1
Major operations, various other.....	30	.....	21	.....	51	.....
Minor operations, various other.....	2,157	.....	105	.....	2,262	.....
Total.....	6,920	19	403	19	7,323	38

TABLE XII.—REPORT OF EYE AND EAR DEPARTMENTS.

Operations performed.	Number.		Operations performed.	Number.	
	Ancon Hospital.	Santo Tomas Hospital.		Ancon Hospital.	Santo Tomas Hospital.
Eye:			Nose:		
Advancement.....	1	.....	Cauterization.....	5	3
Cateract extraction:			Foreign body, removal...	4	6
Simple.....	24	61	Plastic.....	2	1
Combined.....	2	.....	Polypi, removal.....	4	4
Chalazion, removal.....	25	6	Rhinoplasty.....	4	.....
Conjunctival flap.....	1	.....	Sinuses:		
Enucleation.....	4	3	Ethmoid, simple.....	8	2
Foreign body, removal...	19	16	Ethmoid, radical.....	3	.....
Hordeolum, incision.....	14	12	Frontal, simple.....	8	.....
Iridectomy.....	19	15	Frontal, radical.....	5	1
Lachrymal operations:			Maxillary, puncture and irrig.....	10	.....
Dilatation of ducts...	6	12	Maxillary, drainage.....	1	1
Dissection of sac.....	1	2	Submucous resection.....	48	1
Lid operations:			Turbinectomy.....	29	26
Ectropion.....	4	4	Pharynx:		
Entropion.....	4	4	Adenoidectomy.....	176	23
Expression of lids.....	1	1	Cauterizations.....	4	9
Plastic.....	1	.....	Peritonsillar abscess, incision.....	18	22
Needling.....	1	.....	Retropharyngeal abscess, incision.....	.....	1
Pterygium.....	40	15	Tonsilectomy.....	357	152
Refractions.....	701	37	Uvulectomy.....	3	.....
Sclerotomy.....	1	.....	Larynx:		
Tenotomy.....	2	.....	Abscess, incision.....	1	.....
Ear:			Foreign body, removal...	.....	2
Furuncle, incision.....	8	2	Trachea:		
Foreign body, removal...	16	23	Tracheotomy.....	1	3
Mastoid operation:					
Simple.....	9	3			
Radical.....	2	1			
Paracentesis.....	31	.....		
Plastic.....	3	.....		
Polypi, removal.....	1	2			

TABLE XII-A.—REPORT OF X-RAY DEPARTMENTS.

Nature of examinations.	Ancon Hospital.	Santo Tomas Hospital.	Nature of examinations.	Ancon Hospital.	Santo Tomas Hospital.
Arm and forearm.....	107	106	Liver.....	5	30
Chest.....	283	.....	Pelvis.....	17	12
Dental.....	427	38	Ribs.....	45	10
Elbow.....	86	26	Shoulder.....	103	40
Foot and ankle.....	365	24	Sinus.....	135	34
Foreign body.....	34	14	Spine.....	77	46
Gall-bladder.....	65	18	Spleen.....	1	6
Hand.....	201	74	Stomach.....	215	128
Head.....	66	37	Thigh.....	56	50
Hip.....	55	32	Thorax.....	.....	160
Jaw.....	47	80	Treatments.....	60	84
Kidney.....	124	12	Wrist.....	138	22
Knee.....	95	46			
Leg.....	75	48	Total.....	2,882	1,177

CLASSIFICATION OF PLATES USED.—ANCON HOSPITAL.

6½ by 8½.....	1,172	Dental films.....	1,448
8 by 10.....	1,631	X-ray films.....	367
10 by 12.....	2,636		
14 by 17.....	1,084	Total.....	8,338

TABLE XIII.—WARD LABORATORY REPORTS.

	Ancon Hospital.	Colon Hospital.	Santo Tomas Hospital.
Blood examinations (total number).....	6,232	1,636	2,406
Malaria estivo-autumnal.....	434	167	178
Malaria tertian.....	198	50	106
Malaria mixed, tertian and estivo-autumnal.....	11	9	.....
Malaria quartan.....	8	1	.....
Filaria.....	3	.....	.....
Spirillum of relapsing fever.....	4	6	.....
White blood counts.....	2,557	408	106
Red blood counts.....	502	42	55
Differential counts.....	1,073	122	77
Homoglobin estimations.....	4,143	196	682
Stool examinations (total number).....	7,340	982	5,873
Ameba coli.....	58	3	17
Entameba histolytica.....	11	3	53
Uncinaria ova.....	778	52	1,357
Ascaris ova.....	375	25	670
Tricocephalus dispar.....	530	38	771
Bilharzia ova.....	8	1	7
Tinea saginata.....	9	3	.....
Strongyloides.....	276	32	444
Trichuris.....	20	8	.....
Ciliated monads (includes cercomonas hominis and trichomanas vaginalis).....	86	14	44
Balanitidum coli.....	9	.....	2
Pus cells.....	141	22	66
Blood corpuscles.....	54	14	77
Pus, blood and mucus.....	146	15	74
Guaiaec test for occult blood.....	143	26	.....
Urine examinations (total number).....	24,564	3,528	6,597
Acetone.....	88	189	9
Diabetic acid.....	61	.....	1
Albumen.....	5,683	831	1,581
Sugar.....	3,088	5	70
Bile.....	445	7	11
Guaiaec test for occult blood.....	165	10	3
Sediment.....	5,189	253	.....
Epithelial cells.....	7,624	424	402
Cylindroids.....	512	6	169
Hyaline casts.....	2,512	213	678
Granular casts.....	1,718	156	696
Pus casts.....	489	162	63
Pus cells.....	5,979	971	1,566
Red blood corpuscles.....	778	260	94
Pus and blood.....	2,607	41	119
Gonococci.....	140	4	2
Tubercle bacilli.....	.....	25	64
Hemin crystals.....	3	.....	.....
Functional kidney tests.....	79	1	.....
Sputum (total examinations).....	4,633	659	1,260
Tubercle bacilli.....	324	59	257
Pneumococci.....	9	3	4
Spinal fluid.....	257	5	44
Smears of sediment.....	146	2	53
Pneumococcus.....	15	2	6
Meningococcus.....	2	.....	2
Streptococcus.....	.....	1	1
Staphylococcus.....	1	.....	2
Other organisms.....	11	1	.....
Cell count.....	243	3	13
Smear examinations (total number).....	1,326	100	7,399
Urethral.....	856	64	239
Vaginal.....	181	5	6,493
Eyes.....	33	3	37
Nasal.....	9	1	64
Throat.....	18	10	532
Prostatic.....	27	.....	.....
Chest.....	.....	5	.....
Mouth.....	.....	1	.....
Skin.....	.....	10	.....
Others.....	109	4	48
Widal reactions.....	.....	.....	27

TABLE XIV.—SANTO TOMAS HOSPITAL, PANAMA CITY.

Class.	Re- maining.	Ad- mitted.	Died.	Dis- charged.	Re- maining.
Pay cases.....	17	879	36	825	35
Charity cases.....	347	8,617	775	7,784	405
Total.....	364	9,496	811	8,609	440

	Number treated.	American.		Other nations.	
		White.	Black.	White.	Black.
Pay cases.....	896	24		357	515
Charity cases.....	8,964	19		1,074	7,871
Total.....	9,850	43		1,431	8,386

Number of days relief furnished patients.....	156,755
Average number of patients constantly sick.....	400
Average number of days treatment for each patient admitted.....	11
Cost of subsistence per patient per day.....	\$1.44

DISPENSARY REPORT.

	White.	Black.	Total.
Natives treated.....	21	8,184	8,169
Foreigners treated.....	234	3,467	3,701
Total.....	255	11,615	11,870

SURGICAL OPERATIONS.

Amputations:		Thorax:	
Shoulder.....	2	Thoracotomy.....	2
Arm.....	1	Excision of breast.....	2
Hand.....	1	Rectum:	
Hip joint.....	2	Hemorrhoids, radical cure.....	30
Thigh.....	1	Fistula in ano, excision of.....	13
Leg.....	7	Prolapsus rectum, radical excision.....	1
Foot.....	1	General:	
Digits, multiple.....	22	Thyroidectomy.....	6
Operations on bones:		Nerve stretching.....	1
Cranietomy, decompressive.....	1	Varicose veins, excision of.....	6
Laminectomy.....	1	Gunshot wounds of soft parts, operation for.....	3
Wiring of fractures, simple.....	1	Stab wounds of soft parts, operation for.....	2
Wiring of fractures, compound.....	5	Plastic operation for severe injury.....	2
Adenectomy:		Skin graft.....	12
Cervical.....	18	Laparotomy:	
Axillary.....	6	For intestinal obstruction.....	1
Inguinal, single.....	95	Exploratory.....	10
Inguinal, double.....	74	Gastro-enterostomy.....	3
Femoral.....	3	Enterorrhaphy.....	13
Herniotomy:		Appendectomy.....	111
Inguinal, single.....	97	Appendectomy with local peritonitis.....	11
Inguinal, double.....	11	Appendectomy with general peritonitis.....	1
Femoral.....	4	Appendectomy.....	7
Ventral.....	18	Cholecystotomy.....	2
(Combined any 2 of above).....	1	Cholecystectomy.....	11
Strangulated.....	3	Abscess of liver, laparohepatotomy for.....	4
Genito-urinary tract:		Abscess of liver, thoracohepatotomy for.....	4
Ureterotomy.....	7	Splenectomy.....	1
Cystotomy.....	3	Pen-hysterostomy.....	43
Urethrotomy, internal.....	43	Supravaginal hysterectomy.....	72
Urethrotomy, external.....	38	Hysteromyomectomy.....	24
Prostatectomy.....	1	Salpingo-tomy, single.....	28
Varicocele, radical cure.....	12	Salpingostomy, double.....	86
Hydrocele, single, radical cure.....	21	Salpingo-oophorectomy.....	112
Hydrocele, double.....	4	Ovarian cystostomy.....	7
Orchidectomy.....	7	Oophorectomy.....	61
Epididymotomy.....	17	Suspensio-uteri.....	62
Amputation of penis.....	3	For optopic gestation.....	2
Curetage uteri.....	140	Rupture of spleen.....	1
Tracheoplasty.....	9	Major operations, various other.....	117
Tracheorrhaphy.....	2	Minor operations, various.....	1,002
Vaginal punctures.....	3		
Obstetrical:			
Cæsarian section, abdominal.....	1		
Perineorrhaphy.....	8		
		Total.....	2,566

TABLE XV.—REPORT OF BOARD OF HEALTH LABORATORY.

Bacteriological:		Wild and domestic animals—Continued.	
Autochthonous vaccines prepared.....	51	Brain films from cows.....	41
Flood cultures.....	405	Horse's hoof cultures.....	1
Stools cultured for typhoid-dysentery group.....	978	General:	
Stools cultured for typhoid-dysentery group (food handlers).....	309	Photographs taken.....	83
Urines cultured for typhoid group.....	568	Typhoid vaccinations.....	16
Urines cultured for typhoid group (food handlers).....	309	Smallpox vaccinations.....	35
Urines cultured (other organisms).....	279	Chemical:	
Milks—		Spinal fluids—	
Corozal hospital dairy.....	187	Colloidal gold.....	269
Minoti dairy.....	187	Putrefactive acid.....	289
Panama dairies (through H. O. P.).....	444	Ammonium sulphate.....	289
Commisariats.....	18	Ph. nol.....	283
Condensed.....	40	Arsenic.....	4
Panama ice cream.....	47	Blood—	
Colon dairies (through H. O. C.).....	12	Uric acid.....	52
Powdered.....	3	Urea.....	62
Milk bottles.....	2	Creatinin.....	58
Formulas from wards.....	2	Glucose.....	43
Naso-pharyngeal cultures.....	524	Cholesterolin.....	6
Sputum cultures.....	476	Nonprotein in nitrogen.....	52
Throat cultures.....	1,521	Dried blood.....	1
Ear cultures.....	20	Dairy milk.....	472
Eye cultures.....	2	Condensed milk.....	16
Pus from chest.....	1	Mother's milk.....	26
Pus from abscess.....	1	Powdered milk.....	1
Pleural fluid cultures.....	19	Ice cream.....	56
Spinal fluid cultures.....	61	Coloring matter for ice cream.....	1
Asitic fluid cultures.....	3	Cream.....	1
Fluid from knee.....	1	Wat r.....	4
Chand culture.....	1	Washings from milk bottle.....	1
Fluid from gall bladder.....	1	Urine.....	147
Conjunctival cultures.....	2	Urine for acetic acid.....	7
Canned oysters.....	1	Urine for uric acid.....	1
Water culture.....	1	Urine for urea.....	1
Flour culture.....	1	Urine for glucose.....	3
Phenol coefficient test of hveol.....	1	Urine for formaldehyde.....	1
Antony specimen cultures.....	139	Urine for arsenic.....	6
Miscellaneous cultures.....	88	Urine for lead.....	2
Stools examined for parasites.....	105	Gastric analyses.....	32
Stools examined for ameba.....	86	Cizar ttes.....	1
Blood films examined for malaria parasites.....	1,089	Gasoline.....	6
Dark field examinations.....	78	Baling powder.....	1
Throat smears.....	62	Butter.....	5
Sputums examined for T. B.....	98	Oleomargarine.....	25
Leprosy examinations.....	67	Canned oysters.....	1
Urine examined for T. B.....	12	Canned salmon.....	16
Vaginal smears.....	25	Beer for alcohol.....	2
Pus smears.....	96	Alcohol.....	1
Urethral smears.....	91	Port wine sediment.....	1
Skin lesions.....	3	Cosme.....	1
Examination for yaws.....	1	Reverages.....	7
Serological:		Hair tonic.....	1
Wassermann tests.....	12,047	Gun test.....	14
Agglutination tests.....	159	Flour.....	4
Blood typing.....	3	Bread.....	3
Pathological:		Chicken tissue for phosphorus.....	3
Autopsies performed (human).....	371	Meat, cooked.....	1
Surgical tissues examined and reported.....	726	Pleural fluid.....	1
Microscopic slides prepared—		Pills.....	3
Surgical preparations.....	5,141	Arsenical dip.....	5
Autopsy preparations.....	3,542	Cil, "T. N. T.".....	1
Animal preparations.....	1,425	Powder, for alkaloid.....	1
Wild and domestic animals:		Tankage.....	1
Cultures of cattle ears.....	299	Crude carbolic acid.....	3
Cultures of cattle spleens.....	10	Hog feed.....	1
Cultures of horse ears.....	3	Sulphuric acid.....	4
Cultures of hog ear.....	1	Toxicological examination.....	5
Cultures of scrapings from ear and hide.....	4	Carbon dioxide.....	3
Animal autopsies.....	96	Cocoa, for powdered glass.....	1
Animal autopsy specimen cultures.....	19	Clav.....	2
Fowl autopsies.....	10	Calibration of clinical thermometers.....	1,000
Blood films examined.....	597	Safety matches.....	21
Animal tissue specimens examined.....	402	Caterpillars for arsenic.....	3
Immunization of Corozal cattle.....	24	Rice.....	2
Dog observation.....	1	Coconut meal.....	2
Dog stool.....	1	Cottonseed meal.....	2
Animal blood cultures.....	39	Fluid, for arsenic.....	1
Animal hemoglobin.....	41	Talcum powder.....	1
Rats examined.....	17,607	Renal calculi.....	2
Animals inoculated.....	116	Calculi biopsy.....	1
Animal experimentation.....	6	Bleaching powder.....	1
		Potassium citrate.....	1
		Hide, for mercury.....	1
		Liquid, for strychnine.....	1
		Sugar.....	3

TABLE XV—REPORT OF BOARD OF HEALTH LABORATORY—Continued.

Entomological:		ECONOMIC ENTOMOLOGY—continued.	
Anopheles mosquitoes identified, adults.	14,884	hopper; leaf and fly beetles; palm weevil; bag worms; coconut caterpillars; chinch bugs; papaya fruit fly; West Indian fruit fly; avocado weevil; banana borers; fall army worm; Cuban laurel thrips; several species of mill insects; etc.	
Anopheles mosquitoes identified, larvæ (lots).....	54	<i>Plant diseases.</i> —Anthracnose of citrus and avocado; citrus scab; sooty mold; powdery mildew; mal di goma; citrus root rot.	
Yellow fever mosquitoes identified, adults.....	565	Undertaking:	
Yellow fever mosquitoes identified, larvæ (lots).....	304	Bodies handled.....	540
All other mosquitoes identified, adults.....	19,510	Bodies embalmed.....	67
All other mosquitoes identified, larvæ (lots).....	194	Bodies cremated.....	200
Ticks, lice, fleas, flies, etc., identified....	37	Bodies shipped from Isthmus.....	52
ECONOMIC ENTOMOLOGY.		Bodies buried at Corozal.....	157
<i>Insect pests.</i> —Citrus black fly; mealy bugs; several species of white flies; snowy, purple, cottony, papaya, West Indian Red, glassy star, soft green, mango, and other scale insects; leaf cutting, carpenter and tunnel building stinging ants; termites; citrus black bee; red-eyed citrus grass-		Bodies sent to Panama.....	52
		Bodies sent to Colon.....	28
		Bodies sent to other towns on Zone for burial.....	18
		Bodies disinterred.....	7

TABLE XV-A.—CONTAGIOUS AND INFECTIOUS DISEASES REPORTED TO THE CHIEF HEALTH OFFICE, THE PANAMA CANAL, DURING THE YEAR 1919-1920.

	Panama.	Colon.	Canal Zone.	Non-resident.	Total.
Acute contagious conjunctivitis, pink eye.....	.....	15	8	1	24
Chickenpox.....	85	23	116	9	233
Diphtheria.....	78	75	39	2	194
Dysentery.....	10	1	3	4	18
Hookworm disease.....	.....	1	2	.....	3
Influenza.....	312	480	471	44	1,307
Leprosy.....	4	3	3	1	11
Malaria.....	128	106	788	338	1,370
Measles.....	243	97	112	11	463
Meningitis.....	4	.....	3	1	8
Mumps.....	7	13	56	1	77
Paratyphoid fever.....	1	.....	.....	1	2
Pneumonia.....	35	44	30	7	116
Relapsing fever.....	.....	.....	1	1	1
Scarlatina.....	.....	.....	1	.....	1
Scarlet fever.....	4	1	1	.....	6
Smallpox.....	18	.....	1	9	28
Tuberculosis.....	282	122	53	43	500
Typhoid fever.....	10	7	4	14	35
Whooping cough.....	23	147	92	.....	262
Yaws.....	1	.....	.....	.....	1
Yellow fever ¹.....	.....	.....	.....	1	1

¹ Received at Quarantine from Nicaragua.

TABLE XVI.—QUARANTINE SERVICE AT THE PORTS OF BALBOA-PANAMA AND CRISTOBAL-COLON.

Vessels inspected and passed.....	3,410
Vessels detained in quarantine.....	97
Number of days held, 205.....	
Vessels given provisional pratique.....	71
Total.....	3,578
Supplementary inspections of vessels.....	2,021
Vessels fumigated:	
For mosquitos, SO ₂	39
For mosquitos, NACN.....	7
For rats, SO ₂	66
For rats, SO ₂ and NACN.....	5
For disease formalin.....	0
Total.....	117
Crew inspected on arrival.....	168,964
Passengers inspected on arrival.....	56,665
Crew passed on certificate of medical officer.....	71,706
Passengers passed on certificate of medical officer.....	26,928
Total.....	324,263

Supplementary inspections of persons on detained vessels.....	7,365
Persons detained in quarantine station.....	6,131
Number of days held:	
Yellow fever.....	16,453
Plague.....	374
Other diseases.....	404
Total.....	17,231
Persons detained on board vessels.....	20,199
Number of days held:	
Yellow fever.....	17,956
Plague.....	2,173
Other diseases.....	2,424
Total.....	22,553
Persons vaccinated.....	1,190
Persons vaccinated and given certificates good for five years.....	16
Persons detained in quarantine station for immigration laws.....	228
Number of persons deported under immigration laws.....	550

TABLE XVI-A.—REPORT OF QUARANTINE OFFICER, BOCAS DEL TORO.

Vessels inspected and passed.....	295
Crew inspected and passed.....	8,417
Passengers inspected and passed.....	3,250
Passengers in transit inspected and passed.....	4,328
Passengers vaccinated on coastwise vessels.....	431

TABLE XVII.—PERSONNEL REPORT OF THE HEALTH DEPARTMENT.

[Number of employees on June 30, each year.]

	Gold.		Silver.		Total.	
	1919	1920	1919	1920	1919	1920
Chief health office.....	4	3			4	3
Medical storehouse.....	5	4	5	4	10	8
Quarantine service.....	9	13	38	37	47	50
Health office, Panama.....	10	11	150	131	160	142
Health office, Colon.....	15	15	154	151	169	166
Ancon Hospital.....	123	135	236	240	359	375
Colon Hospital.....	18	25	32	35	50	60
Santo Tomas Hospital.....	6	6			6	6
Palo Seco Leper Asylum.....	2	2	21	35	23	37
Zone sanitation.....	5	6	306	147	311	153
Corozal Hospital.....	16	14	96	89	112	103
Line dispensaries.....	9	10	8	8	17	18
Total.....	222	244	1,046	877	1,268	1,121

APPENDIX J.

REPORT OF THE GENERAL PURCHASING OFFICER AND CHIEF OF THE WASHINGTON OFFICE.

THE PANAMA CANAL,
Washington, D. C., July 14, 1920.

SIR: I have the honor to submit the following report on the work of the Washington office of The Panama Canal for the fiscal year ended June 30, 1920:

There have been no important changes in the organization during the fiscal year. The undersigned has remained in charge throughout the year as general purchasing officer and chief of office, with the following divisions under his supervision: Administrative office, including the appointment division and the correspondence and record division; office of the assistant auditor; and the purchasing department.

The work of the appointment division has been handicapped during the past fiscal year by unusual conditions, such as the disruption of the sailing schedule to the Isthmus during the rush of travel in the summer and fall of 1919, due to labor troubles in New York Harbor, principally the longshoremen's strike; the unsettlement of the labor market in the United States, and shortage of skilled and technical men, necessitating unremitting efforts in filling requisitions and maintaining the high standards required of appointees, and the loss during the year of most of the experienced clerks engaged on this work which placed added burdens on the few remaining trained employees in handling the work with new assistants.

The largest single requisition received was for 130 building tradesmen for temporary service on short notice, dated May 5, 1920. Forty-two per cent of those tendered employment during the year failed to accept. Seventeen hundred and ninety-two persons were tendered employment in the grades above that of laborer, of which number 1,032 accepted and were appointed, covering 98 different positions. Four thousand five hundred and ninety-two persons, including new appointees, those returning from leave of absence, and members of employees' families, were provided with transportation from the United States to the Isthmus; and in response to inquiries and applications for employment during this period, and in the issuance of appointments, 21,435 letters were written, 7,525 telegrams sent, and 43,222 circulars mailed.

The increasing commercial use of the Canal since the war has brought with it a corresponding increase in the work of the correspondence and record division in answering inquiries and disseminating general information and literature regarding the Canal, in addition to the usual amount of general correspondence prepared for the signatures of the chief of office and Secretary of War concerning Canal affairs. The work of the division also includes the handling of matters pertaining to legislation affecting the Canal and the prepara-

tion of special reports called for by congressional committees, as well as the deciphering and enciphering of cablegrams. Another feature of the work of this division which has grown to be quite an item is the handling of many matters affecting the Panama Railroad Company in its relations with various departments of the Government at Washington.

The assistant auditor's office prepares all vouchers for payment to be made in the Washington office; keeps all records relative to payments and financial transactions; conducts correspondence relative to payment of claims; has charge of collections; examines and approves transfer settlements; gives the disbursing clerk's accounts an administrative examination before submission to the Auditor for the War Department; prepares the statistical data required to show the distribution of the expenses of the Washington office; makes reports on all claims submitted to the Auditor for the War Department for settlement; prepares all contracts and bonds; has charge of all work in connection with deposits for tolls made with the Treasurer and Assistant Treasurers of the United States; and passes upon all legal questions involved in the transactions of the business of the Washington office of The Panama Canal. The following statements show the volume of the transactions in the assistant auditor's office, which include the work of the disbursing clerk:

Claim statement.

On hand July 1, 1919.....	298
Received from July 1, 1919, to June 30, 1920.....	16,971
To be accounted for.....	17,269
Passed for payment from July 1, 1919, to June 30, 1920.....	16,881
On hand June 30, 1920.....	388

There was an increase of 2,184 claims received and an increase of 2,010 claims examined and passed for payment from the preceding year.

Financial statement of receipts and disbursements July 1, 1919, to June 30, 1920.

Disbursing clerk's balance, July 1, 1919:			
General account as disbursing clerk.....	\$521,094. 47		
Special deposit account.....	99,980. 68		
		\$621,075. 15	
Receipts:			
From United States Treasury.....	8,805,000. 00		
Miscellaneous collections.....	1,760,774. 10		
		10,565,774. 10	
To be accounted for.....		11,186,849. 25	
Disbursements:			
Vouchered expenditures.....	8,180,673. 25		
Repayments to appropriations.....	493,327. 73		
Refundments and disbursements on collections...	96,245. 79		
Collections deposited to appropriations and miscellaneous receipts.....	1,569,220. 45		
		10,339,467. 22	
		847,382. 03	
Disbursing clerk's balance, June 30, 1920:			
General account as disbursing clerk.....	652,093. 49		
Special deposit account.....	195,288. 54		
		847,382. 03	

During the fiscal year 13,635 disbursement vouchers, amounting to \$8,180,673.25, and 225 collection vouchers, amounting to \$1,678,-875.44, were prepared. One thousand six hundred and sixty-one settlements by transfer of appropriations, aggregating \$2,106,758.79, were given an administrative examination and recommendation made thereon. There was an increase of 1,162 disbursement vouchers and a decrease in disbursements of \$575,331.13, as compared with the last fiscal year. There was an increase, however, of \$1,138,626.79 in miscellaneous collections made.

Reports were made upon 31 claims submitted to the Auditor for the War Department, either for direct settlement or for settlement by the auditor after claims had been filed by the contractor. The amount involved in these claims to be passed upon by the Auditor for the War Department upon the reports of this office was \$32,958.20.

During the fiscal year 121 contracts were prepared, amounting to \$5,130,714.76. This was an increase of 37 in number and of \$1,678,-077.18 in amount in comparison with the fiscal year 1919.

The assistant auditor, as legal advisor in the United States for The Panama Canal, has, by the direction of the chief of office, continued to render assistance to the Department of Justice in connection with the preparation for trial and at the trial in the courts of all cases in connection with action brought by or against The Panama Canal. During the fiscal year suits have been pending against The Panama Canal involving claims for \$19,339.48. The disposition of these suits, so far as they have been completed, is as follows:

The case of Patrick Corr & Sons, under annual contract No. 1033, Court of Claims No. 33298, was decided in favor of the Government and damages on its counterclaim amounting to \$6,409.25 were recovered.

The case of the Pelton Water Wheel Company *v.* United States, in the Court of Claims, under Washington Order No. 29725 and supplements thereto, was dismissed. In this case the contractor claimed damages amounting to \$6,037.18.

The sum of \$779.82 was collected on the bond of George R. Johnson, under Washington Order No. 62856.

The only case still pending is that of J. Edward Ogden & Company *v.* United States, in the District Court of the Southern District of New York, Washington Order No. 60890. This is a suit for \$1,468.89 damages. It is ready for trial, but has not yet been reached.

No new suits were brought against The Panama Canal during the fiscal year. Neither have there been any suits brought by the Washington office of The Panama Canal. This shows that The Panama Canal has been able for the last two fiscal years to make expenditures and purchases involving more than \$20,000,000 without a lawsuit.

The purchasing department has been continued as heretofore, nominally under the supervision of the Chief of Engineers, United States Army. The work of the purchasing department has been conducted, in general, in the same manner as in previous years. The purchasing department has also continued practically the same methods relative to the procurement of surplus war material from the War Department and other Government departments having surplus material on hand owing to the cessation of war activities, outlined in my report for the fiscal year ending June 30, 1919. In

connection with utilizing the surplus war material by the several Government departments and independent Government establishments, an Executive order was issued on August 27, 1919, in furtherance of section 5 of the act approved July 11, 1919, "Making appropriations to supply deficiencies, etc.," which reads as follows, and is self-explanatory:

EXECUTIVE ORDER.

Whereas section 5 of the act approved July 11, 1919, "Making appropriations to supply deficiencies, etc.," requires—

That the heads of the several executive departments and other responsible officials in expending appropriations contained in this or any other act, so far as possible shall purchase material, supplies, and equipment, when needed and funds are available, from other services of the Government possessing material, supplies, and equipment no longer required because of the cessation of war activities. It shall be the duty of the heads of the several executive departments and other officials, before purchasing any of the articles described herein, to ascertain from the other services of the Government whether they have articles of the character described that are serviceable. And articles purchased by one service from another, if the same have not been used, shall be paid for at a reasonable price not to exceed actual cost, and if the same have been used, at a reasonable price based upon length of usage. The various services of the Government are authorized to sell such articles under the conditions specified and the proceeds of such sales shall be covered into the Treasury as a miscellaneous receipt: *Provided*, That this section shall not be construed to amend, alter, or repeal the Executive order of December 3, 1918, concerning the transfer of office material, supplies, and equipment in the District of Columbia falling into disuse because of the cessation of war activities.

And whereas, in order to carry out properly the provisions of this act, it is necessary to establish a central agency where information relative to the surplus material, supplies, and equipment of the various services of the Government may be obtained, I hereby designate the General Supply Committee, of the Treasury Department, as the organization to maintain records of such surplus material, supplies, and equipment as may be reported to it by the heads of the various services of the Government. It shall further be the duty of the General Supply Committee to answer promptly inquiries from the head of any service of the Government, or his authorized representative, relative to the probable availability of any surplus material, and to inform the person making the inquiry what service, if any, has reported the material about which the inquiry is made as available.

It shall be the duty of the head of each of the several executive departments and independent establishments of the Government to designate a central agent for his particular service to whom all surplus supplies of his service, under the act, shall be reported; and it shall be the duty of this central agent to advise the General Supply Committee of the surplus material, supplies, and equipment available from his service, to answer inquiries from other services in regard to such material, supplies, and equipment, and to arrange with the other services the details of any purchase which may be made under the provisions of this act.

The provisions of this order shall be carried into effect in accordance with regulations to be prescribed by the Secretary of the Treasury.

WOODROW WILSON.

THE WHITE HOUSE,
27 August, 1919.

In compliance with the instructions contained in the Executive order above referred to, it is, of course, necessary for the purchasing department to forward to the General Supply Committee copies of all of its inquiries for supplies and before making award to ascertain whether or not any of the material for which bids are being invited is available for transfer from the several Government departments. In case the General Supply Committee advises that material is available at the War Department or other Government departments, it is then necessary for the purchasing department to communicate with the department reported as having material available for transfer and ascertain whether the material complies with the Panama Canal specifications, and also to obtain information relative to the price at which offered,

place of delivery, etc. The methods pursued in procuring surplus material, however, are similar to those outlined in my report for the fiscal year ending June 30, 1919, and it is not thought necessary to again go into details relative to same in this report. I might state again, however, that it has always been the policy of the purchasing department to use the utmost endeavor and to extend the fullest cooperation possible toward the disposal of the surplus war material possessed by the War Department and other departments of the Government. In this connection the following communications are interesting and self-explanatory:

THE PANAMA CANAL, PURCHASING DEPARTMENT,
Washington, D. C., March 3, 1920.

Mr. E. C. MORSE,
Director of Sales, War Department,
Washington, D. C.

Subject: Sale of War Department surplus material to The Panama Canal.

Sir: I have received a memorandum from the Secretary of War reading as follows:

"Memorandum for Mr. Flint, Panama Canal:

"I do not know whether the sales department has any surplus products which would be available for the Canal or not, but the prices which the War Department is selling things for would make it highly desirable for the Canal to buy from the War Department if it is in need of any of the materials of which we are now disposing of surplus. Please get in touch with Mr. E. C. Morse, director of sales, and find out whether any such economy can be effected.

"NEWTON D. BAKER,
"Secretary of War."

Our records show that shortly after the signing of the armistice steps were taken to apprise the War Department of the various requirements of The Panama Canal as requisitions were received from the Isthmians, with a view to procuring as much material as practicable from surplus stocks of the War Department in filling our requisitions. In other words, long before any law was passed requiring the various departments to purchase so far as possible material, supplies, and equipment from other services of the Government possessing such material, supplies, and equipment no longer required because of the cessation of war activities, The Panama Canal indicated its willingness to cooperate in every way possible in purchasing surplus material from the War and other departments wherever it was practicable to do so, and arrangements were made, which have been continued, to send copies of all our circulars advertising for material to various offices under the War Department having to do at that time with the disposing of surplus material with a view to offers being made to this office of such material as would fill our requirements. We are now operating under the Executive order of August 27, 1919, under which we advise the General Supply Committee of all our requirements and they in turn advise us if such material appears to be surplus in any of the departments, and if they indicate the material is available in the War Department we immediately so notify the transfer and inventory section, which it is understood has been designated under the provisions of the above-mentioned Executive order as the agency through which arrangements should be made for purchasing surplus materials, with a view to receiving definite advice as to whether such material is available, with the understanding that quotations will be made where the material is actually available. In addition to making these special inquiries we are continuing to send direct to the transfer and inventory section of your office as soon as issued several copies of all our circulars, with the idea that that section will keep posted as to the material for which we are in the market with a view to offering such material if available as surplus stocks at any time before or up to the date set for the opening of bids. If this method is followed out it would seem that we should not fail to receive notice whenever the War Department has surplus material available for transfer to The Panama Canal when we are in the market for such material.

Since the armistice it has been the constant desire of this office to take over as much surplus war material from other departments as may be available at the time we are in the market for same, provided, of course, such material complies with our specifications, or does not vary sufficiently from our specifications to make it impracticable to use the material on the Isthmians.

We have already purchased quite a little material from the War Department, but if you desire to suggest any method by which we could take more material propor-

tionately in the future than we have in the past I should be glad to give consideration to any plan which may facilitate this end.

I have felt that we might at times have purchased material in the past which through not being declared surplus in the War Department at the time we were in the market for it was not offered by the War Department, although it may possibly have become surplus shortly after we made a purchase. On the other hand, the War Department has undoubtedly had surplus materials for which we were not in the market at the time, although we may have come into the market later for such material after the War Department surplus had been disposed of. So far as I can see, it will be very difficult to prevent similar conditions obtaining in the future for the reason that this office can only purchase material as it may be requisitioned from the Isthmus and also because it is understood the Isthmus can not anticipate its requirements beyond what they are now doing.

I should be pleased to make an appointment to discuss this matter further with you at any time you may appoint.

Very respectfully,

A. L. FLINT,
General Purchasing Officer.

WAR DEPARTMENT,
PURCHASE, STORAGE AND TRAFFIC DIVISION,
OFFICE OF THE DIRECTOR OF SALES,
Washington, March 10, 1920.

Mr. A. L. FLINT,
*General Purchasing Officer, The Panama Canal Purchasing Department,
Washington, D. C.*

DEAR SIR: I was very glad to receive your letter of March 3 in connection with supplying to The Panama Canal Zone such materials as are surplus in the War Department.

Reports have been brought to me by my assistants who are handling these transfers that your department has probably taken more interest in the surplus than any other governmental department. It is sometimes found that the material, which at first glance would seem to be usable in the Zone, can not be used owing to some peculiar conditions or expense of transportation; but if you experience any trouble in arranging satisfactory prices or in getting material delivered, I would be glad to have you take the matter up with me personally.

I do not see where any advantageous change can be made in the method of operating, provided you are getting satisfactory cooperation from this office; but I would be glad to take up with you any time you may desire questions where there seems to be a difference of opinion, or where it is to the advantage of the War Department to make a change in the method of operating.

Very truly, yours,

E. C. MORSE, *Director of Sales.*

In connection with the purchase of supplies generally it might be stated that while war conditions are practically over, yet, owing to the labor situation and strikes, and to the fact that the production of material has not kept pace with the demand, high prices have continued during the past year; also deliveries of material are still delayed for long periods in many instances, owing to the above-mentioned conditions and also due to embargoes and car shortages throughout the country.

It might be noted also that owing to labor conditions and shortage of material, competition somewhat decreased during the past fiscal year. This is indicated by the fact that under our regular circulars inviting bids only 5,446 bids were received during the present fiscal year in connection with 124 circulars containing 3,898 classes, as compared with 7,009 bids received in connection with 103 circulars containing 3,896 classes during the fiscal year ending June 30, 1919. I might also add that it has been necessary in many instances to issue two or three calls for bids before obtaining any satisfactory proposals, and to specially communicate with firms requesting them to bid for our requirements.

It goes without saying that on account of the unusual conditions throughout the country and the Government regulations and requirements in connection with the procurement of surplus war material, etc., referred to above, office work and correspondence have necessarily greatly increased, even to a larger extent than during the last fiscal year. The considerable increase in the number of Washington orders placed during the fiscal year, which is somewhat of a criterion as to the amount of the office work, has also increased the work throughout the various branches of the purchasing department. However, notwithstanding the necessity for considerable overtime work, the clerical forces have performed their services with efficiency and willingness. Notwithstanding the good results which have been achieved as a consequence of their long and arduous labors, I feel that if the work does not soon assume a more normal phase it will be necessary to increase the force, as it is not fair to the personnel to expect them to frequently perform overtime work; besides which such conditions, if long continued, are apt to produce discontent and inefficiency. However, it is hoped the resumption of more normal conditions will soon be brought about, thus obviating the necessity of increasing the force. These remarks apply not only to the purchasing department, but to other branches of the Washington office also.

The indications are at the present time that business conditions throughout the country are getting more normal and that prices have a tendency to lower. It is also noted that competition is getting somewhat keener and the number of bids received under our circular invitations for supplies is gradually increasing.

As heretofore the principal purchases have been made by the Washington office, although offices in charge of assistant purchasing agents have been continued at New York, New Orleans, and San Francisco. These offices, as stated in previous reports, also act as receiving and forwarding agencies for such materials as have been purchased for forwarding to the Isthmus through their respective ports. A small force of employees has been continued in the Medical Supply Branch, Zone Supply Office, United States Army, New York City, for the purpose of assisting the officer in charge in making purchases of medical and hospital supplies for the Isthmus, most of which supplies have been purchased through that branch.

The same system as heretofore has been continued relative to the preliminary inspection of materials purchased, and a corps of inspectors under the supervision of the inspecting engineer, located at Washington, has been maintained. The work of inspection has been facilitated as heretofore by assistance rendered by the field officers of the Corps of Engineers, United States Army, and by the Bureau of Standards, the Bureau of Mines, the Bureau of Chemistry, of the Department of Agriculture, and the Medical Department, Ordnance Department, Signal Corps, and Quartermaster Corps of the United States Army.

The number of orders issued during the fiscal year was 8,367, an increase of 898, or 12.02 per cent, as compared with the fiscal year 1919, the number of orders issued during the latter fiscal year being 7,469. The number of orders placed during the fiscal year 1920 exceeds the number issued in any one fiscal year from 1904 to the present fiscal year, with the exception of the fiscal years 1916 and

1917, the number of orders issued during these fiscal years being 8,856 and 8,908, respectively.

The number of orders issued during each fiscal year from 1904 to 1920 is as follows: 1904, 8; 1905, 1,585; 1906, 2,563; 1907, 4,187; 1908, 4,523; 1909, 5,458; 1910, 5,765; 1911, 4,363; 1912, 5,960; 1913, 7,087; 1914, 7,426; 1915, 8,033; 1916, 8,856; 1917, 8,908; 1918, 6,608; 1919, 7,469; 1920, 8,367.

Below is a summary of orders placed through the Washington office of The Panama Canal during each month in the fiscal years 1919 and 1920:

Month.	1918-19	1919-20	Month.	1918-19	1919-20
July.....	541	726	February.....	601	879
August.....	625	656	March.....	760	835
September.....	481	723	April.....	754	576
October.....	629	692	May.....	659	696
November.....	482	545	June.....	667	650
December.....	594	623	Total.....	7,469	8,367
January.....	676	726			

The total value of orders placed by the Washington office during the fiscal year was \$9,133,069.94, as compared with \$6,764,278.62 for the fiscal year 1919, making the grand total of purchases since the year 1904 \$152,480,188.99.

The amount stated above covering the fiscal year 1920 does not include \$401,774.37 paid during the fiscal year for cement ordered under the continuing contract with the Atlas Portland Cement Company entered into in the year 1909, and supplemental contracts, nor does the grand total given for purchases since the year 1904 include \$8,634,013.81 paid since 1909 up to the end of the fiscal year 1920 for cement placed under the above-mentioned contract. Adding the amount of \$8,634,013.81 paid for cement since 1909 to the end of the fiscal year 1920, would make the grand total for purchases under Washington orders since the year 1904 \$161,114,202.80. This amount does not include orders placed by the assistant purchasing agents of The Panama Canal at New York and New Orleans, and by the Medical Supply Branch, Zone Supply Office, United States Army (which offices purchase material for The Panama Canal upon request of the Washington office). It has not been the practice since 1904 to report the value of such orders, although the amount involved, taken as a whole, is quite a considerable sum.

The sales in the United States of scrap and obsolete Canal material handled by the purchasing department amounted to \$678,402.82, based on 58 sale orders, as compared with \$423,194.90 based on 70 sale orders placed during the fiscal year ending June 30, 1919.

There is submitted with this report a table showing increases in salaries authorized over the organization of July 1, 1918, and increases of numbers of persons employed over the number allowed in the 1920 Book of Estimates, as required by the act of Congress approved July 19, 1919.

Very respectfully,

A. L. FLINT,

General Purchasing Officer and Chief of Office.

Brig. Gen. CHESTER HARDING, United States Army,
Governor, The Panama Canal, Balboa Heights, Canal Zone.

Table showing increases in salaries authorized over organization of July 1, 1918, and increases of numbers of persons employed over number allowed in 1920 Book of Estimates, as required by act of Congress approved July 19, 1919.

Designation.	Increase in pay.		Increase in numbers.	
	Rate authorized in organization, July 1, 1918.	Increased to—	Number authorized in 1920 Book of Estimates.	Increased to—
Administrative department:				
Chief of division.....	\$2,400	\$2,500		
Clerk.....	1,800	1,920		
Clerks (\$1,400).....			2	4
Accounting department:				
Assistant auditor.....	4,000	4,500		
Messenger (assistant).....	720	780		

NOTE.—The resignations during the year of almost all of the older experienced clerks in the appointment division of the administrative department and the heavy volume of work due to the unsettled steamship schedules and the labor market in the United States, made necessary the increases in salaries and force as above indicated. The assistant auditor's salary was increased because of the assignment to him of the duties of law clerk in addition to his other duties. This was offset in part by changing the position of chief clerk and law clerk at \$2,750 to chief clerk at \$2,500. The increase in salary of the messenger (assistant) was offset by the reduction in salary of another similar position from \$840 to \$780, the changes being made partly to equalize the salaries of the two positions. The total amount allotted for salaries was not exceeded.

APPENDIX K.

ACTS OF CONGRESS AND EXECUTIVE ORDERS RELATING TO THE PANAMA CANAL AND TO THE CANAL ZONE.

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ACTS OF CONGRESS AND EXECUTIVE ORDERS RELATING TO THE PANAMA CANAL AND TO THE CANAL ZONE.

AN ACT To deport certain undesirable aliens and to deny readmission to those deported.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That aliens of the following classes, in addition to those for whose expulsion from the United States provision is made in the existing law, shall, upon the warrant of the Secretary of Labor, be taken into his custody and deported in the manner provided in sections 19 and 20 of the act of February 5, 1917, entitled "An Act to regulate the immigration of aliens to, and the residence of aliens in, the United States," if the Secretary of Labor, after hearing, finds that such aliens are undesirable residents of the United States, to wit:

(1) All aliens who are now interned under section 4067 of the Revised Statutes of the United States and the proclamations issued by the President in pursuance of said section under date of April 6, 1917, November 16, 1917, December 11, 1917, and April 19, 1918, respectively.

(2) All aliens who since August 1, 1914, have been or may hereafter be convicted of any violation or conspiracy to violate any of the following Acts or parts of Acts, the judgement on such conviction having become final, namely:

(a) An Act entitled "An Act to punish acts of interference with the foreign relations, the neutrality, and the foreign commerce of the United States, to punish espionage, and better to enforce the criminal laws of the United States, and for other purposes," approved June 15, 1917, or the amendment thereof approved May 16, 1918;

(b) An Act entitled "An Act to prohibit the manufacture, distribution, storage, use, and possession in time of war of explosives, providing regulations for the safe manufacture, distribution, storage, use, and possession of the same, and for other purposes," approved October 6, 1917;

(c) An Act entitled "An Act to prevent in time of war departure from and entry into the United States contrary to the public safety," approved May 22, 1918;

(d) An Act entitled "An Act to punish the willful injury or destruction of war material or of war premises or utilities used in connection with war material, and for other purposes," approved April 20, 1918;

(e) An Act entitled "An Act to authorize the President to increase temporarily the Military Establishment of the United States," approved May 18, 1917, or any amendment thereof or supplement thereto;

(f) An Act entitled "An Act to punish persons who make threats against the President of the United States," approved February 14, 1917;

(g) An Act entitled "An Act to define, regulate, and punish trading with the enemy, and for other purposes," approved October 6, 1917, or any amendment thereof;

(h) Section 6 of the Penal Code of the United States.

(3) All aliens who have been or may hereafter be convicted of any offense against section 13 of the said Penal Code committed during the period of August 1, 1914, to April 6, 1917, or of a conspiracy occurring within said period to commit an offense under said section 13, or of any offense committed during said period against the Act entitled "An Act to protect trade and commerce against unlawful restraints and monopolies," approved July 2, 1890, in aid of a belligerent in the European war.

SEC. 2. That in every case in which any such alien is ordered expelled or excluded from the United States under the provisions of this Act the decision of the Secretary of Labor shall be final.

SEC. 3. That in addition to the aliens who are by law now excluded from admission into the United States all persons who shall be expelled under any of the provisions of this Act shall also be excluded from readmission.

Approved, May 10, 1920.

AN ACT Making appropriations for fortifications and other works of defense, for the armament thereof, and for the procurement of heavy ordnance for trial and service, for the fiscal year ending June 30, 1921, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for fortifications and other works of defense, for the armament thereof, and for the procurement of heavy ordnance for trial and service, for the fiscal year ending June 30, 1921, and for other purposes, namely:

* * * * *

PANAMA CANAL FORTIFICATIONS.

For fortifications and armament thereof for the Panama Canal:

For maintenance of clearings and trails, \$30,000;

For protection, preservation, and repair of fortifications, of the Panama Canal, including structures erected for torpedo defense, and for maintaining channels for access to torpedo wharves, \$25,000;

For maintenance and repair of searchlights and electric light and power equipment for fortifications, and for tools, electrical and other supplies, and appliances to be used in their operation, \$20,000;

For the construction of seacoast batteries on the Canal Zone, \$20,000;

For reserve engineer equipment for the fortifications of the Panama Canal, \$7,500;

For the purchase or reclamation of land required for the defenses of the Panama Canal, \$6,250;

For the construction of fire-control stations, the purchase and installation of accessories therefor, and for subaqueous, sound and flash ranging apparatus, including their development, \$474,000;

For operation and maintenance of fire-control installations at sea-coast defenses, \$15,000;

For the purchase, manufacture, and test of ammunition for seacoast and land defense cannon, including the necessary experiments in connection therewith, and the machinery necessary for its manufacture, \$1,000,000;

For the alteration and maintenance and installation of the seacoast artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work, and expenses of civilian mechanics, and extra-duty pay of enlisted men engaged thereon, \$104,546;

For alteration, maintenance, and repair of submarine mine matériel, \$4,138;

For continuing the construction of barracks, quarters, storehouses, and other buildings necessary for accommodating the Coast Artillery troops to be stationed in the vicinity of the Panama Canal, including water, sewer, and electrical systems, roads, walks, and so forth, \$40,000;

The Governor of the Panama Canal, so far as the expenditure of appropriations contained in this Act may be under his direction, shall purchase needed materials, supplies, and equipment from available surplus stocks of the War Department;

For the purchase, manufacture, maintenance, operation, and repair of airships and other aerial machines, buildings, for equipment, and other accessories necessary in the Air Service for use in connection with the seacoast defenses of the Panama Canal, \$100;

For the establishment, construction, enlargement, or improvement of the aviation station at France Field, Canal Zone, for use in connection with the seacoast defenses of the Panama Canal, including the acquisition of land or any interest in land by purchase, lease, condemnation, or otherwise, and the preparation necessary to make the same suitable for the purpose intended, and for the acquisition and improvement of emergency landing fields in the Canal Zone, \$239,000.

In all, specifically for fortifications and armament thereof for the Panama Canal, \$1,985,531.

SEC. 2. That all material purchased under the provisions of this Act shall be of American manufacture except in cases when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases abroad, which material shall be admitted free of duty.

SEC. 3. That except as expressly otherwise authorized herein no part of the sums appropriated by this Act shall be expended in the purchase from private manufacturers of any material at a price in excess of 25 per centum more than the cost of manufacturing such material by the Government, or, where such material is not or has not been manufactured by the Government, at a price in excess of 25 per centum more than the estimated cost of manufacture by the Government.

SEC. 4. That expenditures for carrying out the provisions of this Act shall not be made in such manner as to prevent the operation of the Government arsenals at their

most economical rate of production, except when a special exigency requires the operation of a portion of an arsenal's equipment at a different rate: *Provided*, That no part of the appropriations made in this Act shall be available for the salary or pay of any officer, manager, superintendent, foreman, or other person having charge of the work of any employee of the United States Government while making or causing to be made with a stop watch or other time-measuring device a time study of any job of any such employee between the starting and completion thereof, or of the movements of any such employee while engaged upon such work.

SEC. 5. That no part of the moneys appropriated in each or any section of this Act shall be used or expended for the purchase or acquirement of any article or articles that at the time of the proposed acquirement can be manufactured or produced in each or any of the Government arsenals of the United States for a sum less than it can be purchased or procured otherwise.

SEC. 6. That all orders or contracts for manufacture of material pertaining to approved projects, which are placed with arsenals or other ordnance establishments and which are chargeable to armament of fortifications appropriations, shall be considered as obligations in all respects in the same manner as provided for similar orders placed with commercial manufacturers.

SEC. 7. That whenever any Government bureau or department procures, by purchase or manufacture, stores or materials of any kind, or performs any service for another bureau or department, the funds of the bureau or department for which the stores or materials are to be procured or the service performed may be placed subject to the requisitions of the bureau or department making the procurement or performing the service for direct expenditure: *Provided*, That funds so placed with the procuring bureau shall remain available for a period of two years for the purposes for which the allocation was made unless sooner expended;

SEC. 8. That the following unexpended balances, or portions of the unexpended balances, or combined unexpended balances, or portions of combined unexpended balances of appropriations for fortifications and other works of defense, as set forth in this section, shall be carried to the surplus fund and covered into the Treasury immediately upon the approval of this Act, namely:

*	*	*	*	*	*	*
Sea walls and embankments, Panama Canal,	\$3,000.					
Submarine mine structures,	\$15,200.					
Armament of fortifications, Panama Canal,	\$2,306,481.73.					
Submarine mines, Panama Canal,	\$231,082.21.					

*	*	*	*	*	*	*
Approved, May 21, 1920.						

AN ACT Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1921, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, in full compensation for the service of the fiscal year ending June 30, 1921, namely:

*	*	*	*	*	*	*
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NAVY DEPARTMENT.

*	*	*	*	*	*	*
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HYDROGRAPHIC OFFICE.

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Contingent expenses of branch offices at Boston, New York, Philadelphia, Baltimore, Norfolk, Savannah, New Orleans, San Francisco, Portland (Oregon), Portland (Maine), Chicago, Cleveland, Buffalo, Duluth, Sault Sainte Marie, Seattle, Panama, and Galveston, including furniture, fuel, lights, works, and periodicals relating to hydrography, marine meteorology, navigation, surveying, oceanography, and terrestrial magnetism, stationery, miscellaneous articles, rent, and care of offices, care of time balls, car fare and ferriage in visiting merchant vessels, freight and express charges, telegrams, and other necessary expenses incurred in collecting the latest information for pilot charts, and for other purposes for which the offices were established, \$15,000.

*	*	*	*	*	*	*
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SEC. 6. That all civilian employees of the Governments of the United States and the District of Columbia who receive a total of compensation at the rate of \$2,500 per annum or less, except as otherwise provided in this section, shall receive, during the fiscal year ending June 30, 1921, additional compensation at the rate of \$240 per annum: *Provided*, That such employees as receive a total of annual compensation at a rate more than \$2,500 and less than \$2,740 shall receive additional compensation at such a rate per annum as may be necessary to make their salaries, plus their additional compensation, at the rate of \$2,740 per annum, and no employee shall receive additional compensation under this section at a rate which is more than 60 per centum of the rate of the total annual compensation received by such employee: *Provided further*, That the increased compensation at the rate of \$240 per annum for the fiscal year ending June 30, 1920, shall not be computed as salary in construing this section: *Provided further*, That where an employee in the service on June 30, 1919, has received during the fiscal year 1920, or shall receive during the fiscal year 1921, an increase of salary at a rate in excess of \$200 per annum, or where an employee, whether previously in the service or not, has entered the service since June 30, 1919, whether such employee has received an increase in salary or not, such employees shall be granted the increased compensation provided herein only when and upon the certification of the person in the legislative branch or the head of the department or establishment employing such persons of the ability and qualifications personal to such employees as would justify such increased compensation: *Provided further*, That the increased compensation provided in this section to employees whose pay is adjusted from time to time through wage boards or similar authority shall be taken into consideration by such wage boards or similar authority in adjusting the pay of such employees.

The provisions of this section shall not apply to the following: Employees paid from the postal revenues and sums which may be advanced from the Treasury to meet deficiencies in the postal revenues; employees of the Panama Canal on the Canal Zone;

* * * * *

Approved, May 29, 1920.

AN ACT Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1921.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, appropriated, out of any money in the Treasury of the United States not otherwise appropriated, in full compensation for the fiscal year ending June 30, 1921, for the purposes and objects hereinafter expressed, namely:

DEPARTMENT OF AGRICULTURE.

* * * * *

WEATHER BUREAU.

* * * * *

General Expenses, Weather Bureau: For carrying into effect in the District of Columbia and elsewhere in the United States, in the West Indies, in the Panama Canal, the Caribbean Sea, and on adjacent coasts, in the Hawaiian Islands, in Bermuda, and in Alaska, the provisions of an Act approved October 1, 1890, so far as they relate to the weather service transferred thereby to the Department of Agriculture, * * *.

Total for Weather Bureau, \$1,876,550.

* * * * *

Approved, May 31, 1920.

AN ACT Making appropriations for the Diplomatic and Consular Service for the fiscal year ending June 30, 1921.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, severally appropriated, in full compensation for the Diplomatic and Consular Service for the fiscal year ending June 30, 1921, out of any money in the Treasury not otherwise appropriated, for the objects hereinafter expressed, namely:

* * * * *

PAYMENT TO THE GOVERNMENT OF PANAMA.

To enable the Secretary of State to pay to the Government of Panama the ninth annual payment, due on February 26, 1921, from the Government of the United States to the Government of Panama under article 14 of the treaty of November 18, 1903, \$250,000.

* * * * *

RELIEF AND PROTECTION OF AMERICAN SEAMEN.

Relief and protection of American seamen in foreign countries, and in the Panama Canal Zone, and shipwrecked American seamen in the Territory of Alaska, in the Hawaiian Islands, Porto Rico, and the Philippine Islands, \$100,000.

* * * * *

Approved, June 4, 1920.

AN ACT To remove a certain tract or lots of land in Cristobal, Canal Zone, from the operation and effect of the Executive order of the President of December 5, 1912, pursuant to the Act of Congress of August 24, 1912 (Thirty-seventh Statutes, chapter 390, page 565).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following tract of land situated within the Canal Zone, and more particularly described as lots numbered six hundred and forty-one, six hundred and forty-three, six hundred and forty-five, and six hundred and forty-seven, in the town of Cristobal, Canal Zone, the same being bounded on the north by Eleventh Street, on the east by Bolivar Street, on the south by lot numbered six hundred and forty-nine, and on the west by a vacant lot, the said lots or tract of land having an extension from north to south of one hundred and twenty feet and from east to west of one hundred feet, and measuring in superficial area twelve thousand square feet, be, and the same is hereby, withdrawn from the operation and effect of the Act of Congress approved August 24, 1912, known as the Panama Canal Act (Thirty-seventh Statutes, chapter 390, page 565), and the subsequent Executive order of the President, issued pursuant to the said Act of Congress under date of December 5, 1912.

SEC. 2. The Panama Railroad Company is hereby authorized to sell, transfer, and convey said lots or tracts of land with all improvements thereon to any other person or persons or association of persons and retain the consideration therefor for its own use.

Approved, June 5, 1920.

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1921, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending June 30, 1921, namely:

* * * * *

WAR DEPARTMENT.

* * * * *

QUARTERMASTER CORPS.

* * * * *

NATIONAL CEMETERIES: * * * Disposition of remains of officers, soldiers, and civilian employees: For interment, cremation (only upon request from relatives of the deceased), or preparation and transportation to their homes or to such national cemeteries as may be designated by proper authority, in the discretion of the Secretary of War, of the remains of officers, cadets, United States Military Academy, including acting assistant surgeons and enlisted men in active service, and accepted applicants for enlistment; interment, or preparation and transportation to their homes, of the remains of civil employees of the Army in the employ of the War Department who die abroad, in Alaska, in the Canal Zone, or on Army transports, * * * \$21,549,000: *Provided,* That the above provisions shall be applicable in the cases of officers and enlisted men on the retired list of the Army who have died or may hereafter die while on active duty by proper assignment and also to citizens

of the United States who may have died while serving in the armies of the Allies associated with the American forces: *Provided further*, That, in addition to the foregoing sum, the unobligated balance of the appropriation "Disposition of Remains of Officers, Soldiers, and Civil Employees," for the fiscal year 1920 is made available during the fiscal year 1921 for the care and maintenance of graves of officers, soldiers, and civilian employees of the Army abroad, and for the preparation and shipment of their remains to their homes, or to national cemeteries: *Provided further*, That there may be expended from and after the approval of this Act and until June 30, 1921, from this appropriation and the appropriation for this purpose for the fiscal year 1920, a total amount not exceeding \$250,000 for personal services in the Cemeterial Division, Office of the Quartermaster General, War Department, for compiling, recording, preparing, and transmitting data incident to the disposition of the remains referred to herein; this sum may be expended notwithstanding the third proviso of the paragraph entitled "Temporary employees, War Department," contained in the Legislative, Executive, and Judicial Appropriation Act for the fiscal year 1921.

* * * * *

DEPARTMENT OF THE INTERIOR.

* * * * *

SAINT ELIZABETHS HOSPITAL.

For support, clothing, and treatment in Saint Elizabeths Hospital of the insane from the Army, Navy, Marine Corps, Coast Guard, inmates of the National Home for Disabled Volunteer Soldiers, persons charged with or convicted of crimes against the United States who are insane, all persons who have become insane since their entry into the military and naval service of the United States, civilians in the quartermaster's service of the Army, persons transferred from the Canal Zone, who have been admitted to the hospital and who are indigent, * * * \$1,000,000; * * *

* * * * *

DEPARTMENT OF COMMERCE.

* * * * *

COAST AND GEODETIC SURVEY.

* * * * *

Field expenses: For surveys and necessary resurveys of the Atlantic and Gulf coasts of the United States, including the coasts of outlying islands under the jurisdiction of the United States: *Provided*, That not more than \$45,000 of this amount shall be expended on the coasts of said outlying islands, and the Atlantic entrance to the Panama Canal, \$104,000;

* * * * *

THE PANAMA CANAL.

For every expenditure requisite for and incident to the maintenance and operation, sanitation, and civil government of the Panama Canal and Canal Zone, including the following: Compensation of all officials and employees, including \$1,000 additional compensation to the Auditor for the War Department for extra services in auditing accounts for the Panama Canal; foreign and domestic newspapers and periodicals; law books not exceeding \$500, textbooks and books of reference; printing and binding, including printing of annual report; rent and personal services in the District of Columbia; purchase or exchange of typewriting, adding, and other machines; purchase or exchange, maintenance, repair, and operation of motor-propelled and horse-drawn passenger-carrying vehicles; claims for damages to vessels passing through the locks of the Panama Canal, as authorized by the Panama Canal Act; claims for losses of or damages to property arising from the conduct of authorized business operations; claims for damages to property arising from the maintenance and operation, sanitation, and civil government of the Panama Canal; acquisition of land and land under water, as authorized in the Panama Canal Act; expenses incurred in assembling, assorting, storing, repairing, and selling material, machinery, and equipment heretofore or hereafter purchased or acquired for the construction of the Panama Canal which are unserviceable or no longer needed, to be reimbursed from the proceeds of such sales; expenses incident to conducting hearings and examining estimates for appropriations on the Isthmus; expenses incident to any emergency arising because

of calamity by flood, fire, pestilence, or like character not foreseen or otherwise provided for herein; per diem allowance in lieu of subsistence when prescribed by the Governor of the Panama Canal, to persons engaged in field work or traveling on official business, pursuant to section 13 of the Sundry Civil Appropriation Act approved August 1, 1914; and for such other expenses not in the United States as the Governor of the Panama Canal may deem necessary best to promote the maintenance and operation, sanitation, and civil government of the Panama Canal, all to be expended under the direction of the Governor of the Panama Canal and accounted for as follows:

For maintenance and operation of the Panama Canal, salary of the governor, \$10,000; purchase, inspection, delivery, handling, and storing of material, supplies, and equipment for issue to all departments of the Panama Canal, the Panama Railroad, other branches of the United States Government, and for authorized sales, payment in lump sums of not exceeding the amounts authorized by the injury compensation Act approved September 7, 1916, to alien cripples who are now a charge upon the Panama Canal by reason of injuries sustained while employed in the construction of the Panama Canal, \$7,531.851, together with all moneys arising from the conduct of business operations authorized by the Panama Canal Act;

For sanitation, quarantine, hospitals, and medical aid and support of the insane and of lepers, and aid and support of indigent persons legally within the Canal Zone, including expenses of their deportation when practicable, and including additional compensation to any officer of the United States Public Health Service detailed with the Panama Canal as chief quarantine officer, \$850,000;

For civil government of the Panama Canal and Canal Zone, salaries of district judge \$7,500, district attorney \$5,000, marshal \$5,000, and for gratuities and necessary clothing for indigent discharged prisoners, \$900,000:

In all, \$9,281,851, to be available until expended.

Except in cases of emergency, or conditions arising subsequent to and unforeseen at the time of submitting the annual estimates to Congress, and except for those employed in connection with the construction of permanent quarters, offices, and other necessary buildings, dry docks, repair shops, yards, docks, wharves, warehouses, storehouses, and other necessary facilities and appurtenances for the purpose of providing coal and other materials, labor, repairs, and supplies, and except for the permanent operating organization under which the compensation of the various positions is limited by section 4 of the Panama Canal Act, there shall not be employed at any time during the fiscal year 1921 under any of the foregoing appropriations for the Panama Canal, any greater number of persons than are specified in the notes submitted, respectively, in connection with the estimates for each of said appropriations in the annual Book of Estimates for said year, nor shall there be paid to any such person during that fiscal year any greater rate of compensation than was authorized to be paid to persons occupying the same or like positions on July 1, 1919; and all employments made or compensation increased because of emergencies or conditions so arising shall be specifically set forth, with the reasons therefor, by the governor in his report for the fiscal year 1921.

In addition to the foregoing sums there is appropriated, for the fiscal year 1921 for expenditures and reinvestment under the several heads of appropriation aforesaid without being covered into the Treasury of the United States, all moneys received by the Panama Canal from services rendered or materials and supplies furnished to the United States, the Panama Railroad Company, the Canal Zone government, or to their employees, respectively, or to the Panama Government, from hotel and hospital supplies and services: from rentals, wharfage, and like service: from labor, materials, and supplies and other services furnished to vessels other than those passing through the Canal, and to others unable to obtain the same elsewhere: from the sale of scrap and other by-products of manufacturing and shop operations; from the sale of obsolete and unserviceable materials, supplies, and equipment purchased or acquired for the operation, maintenance, protection, sanitation, and government of the canal and Canal Zone; and any net profits accruing from such business to the Panama Canal shall annually be covered into the Treasury of the United States.

In addition there is appropriated for the operation, maintenance, and extension of water works, sewers, and pavements in the cities of Panama and Colon, during the fiscal year 1921, the necessary portions of such sums as shall be paid as water rentals or directly by the Government of Panama for such expenses.

SEC. 2. That all sums appropriated by this Act for salaries of officers and employees of the Government shall be in full for such salaries for the fiscal year 1921, and all laws or parts of laws to the extent they are in conflict with the provisions of this Act are repealed.

SEC. 4. Any journal, magazine, periodical, or similar publication which is now being issued by a department or establishment of the Government may, in the discretion of the head thereof, be continued, within the limitation of available appropriations or other Government funds, until June 30, 1921, when, if it shall not have been specifically authorized by Congress before that date, such journal, magazine, periodical, or similar publication shall be discontinued.

* * * * *

SEC. 7. Hereafter no department or other Government establishment shall dispose of any typewriting machines by sale, exchange, or as part payment for another typewriter, that has been used less than three years.

Approved, June 5, 1920.

AN ACT Making appropriations for the support of the Army for the fiscal year ending June 30, 1921, and for other purposes.

Be it enacted by the Senate and House of Representative of the United States of America in Congress assembled, That the following sums be, and they are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the year ending June 30, 1921:

* * * * *

MEDICAL DEPARTMENT.

MEDICAL AND HOSPITAL DEPARTMENT.

For the manufacture and purchase of medical and hospital supplies, including disinfectants, for military posts, camps, hospitals, hospital ships and transports, for laundry work for enlisted men and Army nurses while patients in a hospital, and supplies required for mosquito destruction in and about military posts in the Canal Zone, \$3,500,000:

* * * * *

HOSPITAL CARE, CANAL ZONE GARRISONS.

For paying the Panama Canal such reasonable charges, exclusive of subsistence, as may be approved by the Secretary of War for caring in its hospitals for officers, enlisted men, military prisoners, and civilian employees of the Army admitted thereto upon the request of proper military authority, \$60,000: *Provided*, That the subsistence of the said patients, except commissioned officers, shall be paid to said hospitals out of the appropriation for subsistence of the Army at the rates provided therein for commutation of rations for enlisted patients in general hospitals.

* * * * *

Approved, June 5, 1920.

AN ACT Making appropriations to supply deficiencies in appropriations for the fiscal year ending June 30, 1920, and prior fiscal years, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in appropriations for the fiscal year ending June 30, 1920, and prior fiscal years, and for other purposes, namely:

* * * * *

DEPARTMENT OF STATE.

FOREIGN INTERCOURSE.

* * * * *

RELIEF AND PROTECTION OF AMERICAN SEAMEN: Relief and protection of American seamen in foreign countries, and in the Panama Canal Zone, and shipwrecked American seamen in the Territory of Alaska, in the Hawaiian Islands, Porto Rico, and the Philippine Islands, \$35,000.

* * * * *

GOVERNMENT PRINTING OFFICE.

* * * * *

Hereafter the head of each department and independent establishment of the Government shall on the first day of each regular session submit in writing a report to the Congress giving the aggregate number of the various publications it has issued during the preceding fiscal year giving same in detail, and shall also report the cost of paper used for such publications, cost of printing and the cost of preparation of each publication, and the number of each which has been distributed.

* * * * *

SEC. 5. That this Act hereafter may be referred to as the "Third Deficiency Act, fiscal year 1920."

Approved, June 5, 1920.

EXECUTIVE ORDER.

ORDER OF JULY 12, 1919, AMENDING RULES AND REGULATIONS PROMULGATED UNDER THE EXECUTIVE ORDER OF AUGUST 8, 1918, ISSUED IN PURSUANCE OF AN ACT OF CONGRESS APPROVED THE 22ND DAY OF MAY, 1918, ENTITLED "AN ACT TO PREVENT IN TIME OF WAR DEPARTURE FROM AND ENTRY INTO THE UNITED STATES CONTRARY TO THE PUBLIC SAFETY," WITH SPECIAL REFERENCE TO THE WAIVER OF UNITED STATES CITIZENS' IDENTITY CARDS AND PERMITS TO DEPART FOR CERTAIN CITIZENS AND ALIENS WHO WISH TO TRAVEL BETWEEN THE CONTINENTAL UNITED STATES AND THE PANAMA CANAL ZONE.

I, Frank L. Polk, Acting Secretary of State of the United States of America, acting under and by virtue of the authority vested in me by Sections 1 and 39, of the above mentioned rules and regulations as amended by Paragraph III of the Executive Order of March 3, 1919, do hereby prescribe the following exceptions and additions to the said rules and regulations, with special reference to Title 2, Section 11-A.

SECTION 1. Citizens of the United States and other persons owing allegiance to the United States, including employees of the Panama Canal and Panama Railroad, traveling between the continental United States and the Canal Zone or between the insular possessions of the United States and the Canal Zone shall not be required to bear passports, identity cards, or permits. Co-belligerents and neutrals may make the same journeys on passports issued, renewed, or visaed, by their respective Government authorities within sixty days of the date of departure, without permits. Hostile aliens shall continue to bear passports and permits to depart.

SECTION 2. The foregoing amendments supersede all existing rules and regulations in conflict therewith.

FRANK L. POLK,
Acting Secretary of State.

DEPARTMENT OF STATE,
Washington, July 12, 1919.

PROCLAMATION

ABROGATING REGULATIONS GOVERNING THE FLYING OF CIVILIAN AIRCRAFT.

WHEREAS, under and by virtue of the authority vested in me by the Constitution of the United States as Commander-in-Chief of the Army and Navy of the United States and of the militia of the several States when called into actual service of the United States, I declared and established as a war measure by proclamation No. 1432 of February 28, 1918, rules and regulations governing flying by aircraft within the whole of the United States and its territorial waters and of the insular possessions and of the Panama Canal Zone, declaring said territory a zone of military operation and of military preparation:

And whereas, the necessity, as a war measure, for the continuance in effect of said rules and regulations has come to an end, now therefore:

I, WOODROW WILSON, President of the United States of America, do hereby proclaim to all whom it may concern that the Presidential proclamation No. 1432 of February 28, 1918, and the rules and regulations therein contained and the power and authority therein and thereby conferred upon military and naval commanders and forces are hereby abrogated, withdrawn and annulled from and after the date hereof.

IN WITNESS WHEREOF I have hereunto set my hand and caused the seal of the United States to be affixed.

DONE in the District of Columbia this thirty-first day of July, in the year of our [SEAL.] Lord one thousand nine hundred nineteen and of the independence of the United States the one hundred and forty-fourth.

WOODROW WILSON.

By the President:

ROBERT LANSING

Secretary of State.

[No. 1532.]

EXECUTIVE ORDER.

In pursuance of the authority conferred upon the President of the United States by section 2 of the act approved August 18, 1914, entitled "An Act to provide for the admission of foreign-built ships to American registry for the foreign trade, and for other purposes," it is hereby ordered:

That the provisions of law requiring survey, inspection and measurement, by officers of the United States, of foreign-built ships admitted to United States registry under said Act are hereby suspended so far and for such length of time as is herein provided, namely: The said provisions shall not apply to any such foreign-built ship during the period of eighteen months from September 1, 1919, provided the Secretary of Commerce is satisfied in the case of any such ship that the ship is safe and seaworthy and that proper effort is being made to comply with the said provision.

WOODROW WILSON.

THE WHITE HOUSE,
8 August, 1919.

[No. 3142.]

EXECUTIVE ORDER.

WHEREAS the following Joint Resolution adopted by Congress was approved by the President May 12, 1917:

"Joint Resolution Authorizing the President to take over for the United States the possession and title of any vessel within its jurisdiction, which at the time of coming therein was owned in whole or in part by any corporation, citizen, or subject of any nation with which the United States may be at war, or was under register of any such nation, and for other purposes.

"Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the President be, and he is hereby, authorized to take over to the United States the immediate possession and title of any vessel within the jurisdiction thereof, including the Canal Zone and all territories and insular possessions of the United States except the American Virgin Islands, which at the time of coming into such jurisdiction was owned in whole or in part by any corporation, citizen, or subject of any nation with which the United States may be at war when such vessel shall be taken, or was flying the flag of or was under register of any such nation or any political subdivision or municipality thereof; and, through the United States Shipping Board, or any department or agency of the Government, to operate, lease, charter, and equip such vessel in any service of the United States, or in any commerce, foreign or coastwise.

"Sec. 2. That the Secretary of the Navy be, and he is hereby, authorized and directed to appoint, subject to the approval of the President, a board of survey, whose duty it shall be to ascertain the actual value of the vessel, its equipment, appurtenances and all property contained therein, at the time of its taking, and to make a written report of their findings to the Secretary of the Navy, who shall preserve such report with the records of his department. These findings shall be considered as competent evidence in all proceedings on any claim for compensation."

AND WHEREAS from time to time during the period of the war, vessels which were at the time of coming into the jurisdiction of the United States owned in whole or in part by a corporation, citizen or subject of the Empire of Germany, a nation with which the United States is now at war, or vessels which were flying the flag or under the register of the Empire of Germany or of a political subdivision or municipality thereof,

or of any nation with which the United States is at war, have been taken over and operated by the United States or in the service of the United States.

Now THEREFORE, the possession and title of the United States in all such vessels is taken over in accordance with Joint Resolution adopted by Congress and approved by the President May 12, 1917.

WOODROW WILSON.

THE WHITE HOUSE,
November 24, 1919.

[No. 3176.]

EXECUTIVE ORDER

AMENDING SECTION 3 OF THE EXECUTIVE ORDER OF FEBRUARY 2, 1914, PROVIDING CONDITIONS OF EMPLOYMENT FOR THE PERMANENT FORCE FOR THE PANAMA CANAL.

By virtue of the authority vested in me by law, Section 3 of an Executive Order providing conditions of employment for the permanent force of the Panama Canal, issued February 2, 1914, is hereby amended so as to read as follows:

3. The compensation and conditions of employment of persons employed in the United States will be specified in the appointments. The compensation of such persons will begin upon date of embarkation at port of departure from the United States, and they will be granted free transportation from port of departure, including meals on the steamer, but no compensation or expenses for the journey to the port; but former employees from the United States whose services were terminated other than on account of reduction of force, and whose next preceding service with the Panama Canal was less than one year, shall be paid only from date of entry into the service on the Isthmus, and will be allowed only such reduced rates of transportation to the Isthmus as may be available for government employees. Employees appointed at an hourly rate will be paid for the period of transit to the Isthmus on the basis of an eight-hour day exclusive of Sundays. Except in case of discharge or other separation from the service beyond the employee's control, payment of salary from date of embarkation to date of arrival on the Isthmus will not be made unless service on the Isthmus continues for thirty days.

This order shall take effect on and after this date.

WOODROW WILSON.

THE WHITE HOUSE,
25 November, 1919.

[No. 3182.]

EXECUTIVE ORDER.

The area of land hereinafter described, to be known as QUARRY HEIGHTS RESERVATION, situated in the Canal Zone, is hereby set apart and assigned to the uses and purposes of a military reservation under the jurisdiction of the Secretary of War; but the said area shall be subject to the civil control and jurisdiction of the Governor of the Panama Canal, in conformity with the Panama Canal Act.

The boundaries of said reservation are described as follows:

The point of beginning is a brass plug in concrete monument #10; which is N. 1° 51' W., 711.4 feet, more or less, from Ancon triangulation station; the coordinates of Ancon station are Lat. 8°-57' plus 2572.76 feet, Long. 79°-33' plus 883.66 feet; thence,

1. S. 76°-06' E., 833 feet, more or less, to a brass plug in concrete monument #11; thence,

2. S. 12°-40' E., 500 feet, more or less, to a brass plug in concrete monument #1; thence,

3. S. 55°-39' E., 546 feet, more or less, to a copper plug in concrete monument #2; thence,

4. Along a line parallel with and 5.60 feet back from the curb line of the westerly side of Fourth of July Avenue, to a copper plug in concrete monument #3; direct bearing and distance, #2 to #3, S. 38°-19' W., 1369 feet, more or less; thence,

5. Along a line parallel with and 5.60 feet back from the curb line of the northerly side of the continuation of Fourth of July Avenue towards East Balboa, to monument #4, which is a copper plug set in the concrete roadway leading to the Truck Company barracks; direct bearing and distance, #3 to #4, S. 87°-03' W., 1080 feet, more or less; thence,

6. N. 74°-03' W., 505 feet, more or less, to a brass plug in concrete monument #5; thence,

7. N. 18°-09' E., 214 feet, more or less, to a brass plug in concrete monument #6; thence,

8. Along the contour of 150 feet elevation to a brass plug in concrete monument #7; direct bearing and distance, #6 to #7, N. 3°-27' W., 867 feet, more or less; thence,

9. Along the contour of 150 feet elevation to a brass plug in concrete monument #8; direct bearing and distance, #7 to #8, N. 48°-21' W., 569 feet, more or less; thence,

10. Along the contour of 150 feet elevation to a brass plug in concrete monument #9; direct bearing and distance, #8 to #9, N. 39°-36' E., 971 feet, more or less; thence,

11. S. 75°-58' E., 861 feet, more or less, to the point of beginning.

All bearings refer to the true meridian.

WOODROW WILSON.

THE WHITE HOUSE,
22 December, 1919.

[No. 3202.]

EXECUTIVE ORDER.

The area of land hereinafter described, to be known as Fort William D. Davis Reservation, consisting of two parcels, situated in the Canal Zone, is hereby set apart and assigned to the uses and purposes of a military reservation, under the jurisdiction of the Secretary of War; but said area shall be subject to the civil control and jurisdiction of the Governor of the Panama Canal in conformity with the Panama Canal Act.

The boundaries of said reservation are described as follows:

The boundary of the first parcel (east of the Panama Railroad) begins at a copper plug, set in the east curb of the New Gatun road, 100 feet easterly from center line of the Panama Railroad, the coordinates of whose position are Lat. 9°-16' plus 4519.0 feet, Long. 79°-55' plus 207.7 feet; thence,

1. Northeasterly along a road to an iron rail monument, at intersection of two roads, in Lat. 9°-16' plus 4661.3 feet, Long. 79°-54' plus 5819.2 feet; thence,

2. N. 20°-25' W., 232.4 feet, along a road to a 1½" g. i. pipe monument, in Lat. 9°-16' plus 4879.0 feet, Long. 79°-54' plus 5900.3 feet; thence,

3. Northeasterly along a road to a 1½" g. i. pipe monument, on west side of road, in Lat. 9°-16' plus 5028.0 feet, Long. 79°-54' plus 5522.0 feet; thence,

4. Easterly along a line parallel with and 100 feet northerly from spur track to Agua Clara Reservoir to a 1½" g. i. pipe monument, at intersection with Agua Clara boundary, in Lat. 9°-16' plus 4733.5 feet, Long. 79°-54' plus 4806.6 feet; thence,

5. N. 49°-54' E., 2044.0 feet along Agua Clara Reservoir boundary to a monument, in Lat. 9°-17' plus 2.6 feet, Long. 79°-54' plus 3243.1 feet; thence,

6. N. 50°-41' E., 542.6 feet, to a monument, on the boundary of Agua Clara Reservoir, in Lat. 9°-17' plus 356.4 feet, Long. 79°-54' plus 2823.2 feet; thence,

7. S. 87°-57' E., 2517.8 feet, to a monument, on the boundary of Agua Clara Reservoir, in Lat. 9°-17' plus 266.2 feet, Long. 79°-54' plus 307.0 feet; thence,

8. S. 87°-10' E., 1873.3 feet, to a monument, on the boundary of Agua Clara Reservoir, in Lat. 9°-17' plus 173.6 feet, Long. 79°-53' plus 4443.9 feet; thence,

9. S. 87°-48' E., 719.8 feet, to a monument, on the boundary of Agua Clara Reservoir, in Lat. 9°-17' plus 146.0 feet, Long. 79°-53' plus 3724.6 feet; thence,

10. S. 87°-38' E., 478.9 feet, to a monument, on the boundary of Agua Clara Reservoir, in Lat. 9°-17' plus 126.2 feet, Long. 79°-53' plus 3246.1 feet; thence,

11. S. 87°-25' E., 1394.0 feet, to a 1½" g. i. pipe monument, 100 feet west of Panama Railroad track and opposite transmission tower 10-5, in Lat. 9°-17' plus 63.2 feet, Long. 79°-53' plus 1853.5 feet; thence,

12. Northerly and easterly along a line parallel with and 100 feet distant from Panama Railroad track, to the shore of Gatun Lake; thence,

13. Northerly along the shore of said lake to a 1½" g. i. pipe monument, in Lat. 9°-17' plus 4789.3 feet, Long. 79°-52' plus 4765.5 feet; thence,

14. N. 89°-57' W., 1377.2 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, cemented into rock bottom of small stream, in Lat. 9°-17' plus 4790.6 feet, Long. 79°-53' plus 135.1 feet; thence,

15. S. 89°-58' W., 1388.8 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the west bank of a small stream, in Lat. 9°-17' plus 4789.7 feet, Long. 79°-53' plus 1523.9 feet; thence,

16. S. 89°-56' W., 518.1 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a hill, in Lat. 9°-17' plus 4789.1 feet, Long. 79°-53' plus 2042.0 feet; thence,

17. S. 89°-53' W., 553.9 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a hill, in Lat. 9°-17' plus 4788.0 feet, Long. 79°-53' plus 2595.9 feet; thence,

18. S. 89°-10' W., 301.3 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, in Lat. 9°-17' plus 4783.2 feet, Long. 79°-53' plus 2897.2 feet; thence,

19. S. 75°-05' W., 4760.8 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a hill, in Lat. 9°-17' plus 3557.3 feet, Long. 79°-54' plus 1489.9 feet; thence,

20. S. 75°-05' W., 728.6 feet, to a bolt, in center of a concrete bridge on old Gatun road, in Lat. 9°-17' plus 3370.0 feet, Long. 79°-54' plus 2193.9 feet; thence,

21. Due west, 410.8 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on north side of old Gatun road, in Lat. 9°-17' plus 3370.0 feet, Long. 79°-54' plus 2604.7 feet; thence,

22. Due west, 1291.3 feet, to a brass plug, set in new concrete road one foot from west edge, in Lat. 9°-17' plus 3370.0 feet, Long. 79°-54' plus 3896.0 feet; thence,

23. N. 30°-26' W., 2074.1 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the northeasterly end of the north levee of the Mindi hydraulic fill, in Lat. 9°-17' plus 5158.3 feet, Long. 79°-54' plus 4946.6 feet; thence,

24. Southwesterly along said levee to a $1\frac{1}{2}$ " g. i. pipe monument, on southwesterly end of the levee and 100 feet from center line of Panama Railroad track at transmission bridge, 4-16, in Lat. 9°-17' plus 4290.5 feet, Long. 79°-55' plus 531.6 feet; thence,

25. Southerly along a line parallel with and 100 feet easterly from center line of Panama Railroad track to the point of beginning.

All pipe monuments are painted white and stenciled in black "Mil. Res." where the boundary lines intersect the sides of the pipe.

The boundary of the second parcel (west of the Panama Railroad) begins at a $1\frac{1}{2}$ " g. i. pipe monument on the north side of the New Gatun road and 100 feet westerly from center line of the Panama Railroad, in Lat. 9°-16' plus 4596.2 feet, Long. 79°-55' plus 395.3 feet; thence,

1. Northerly along a line parallel with and 100 feet westerly from center line of Panama Railroad track to a $1\frac{1}{2}$ " g. i. pipe monument, in Lat. 9°-17' plus 4290.5 feet, Long. 79°-55' plus 731.6 feet; thence,

2. N. 85°-58' W., 1000.5 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, 500 feet east of the center line of the Canal, on a ridge, in Lat. 9°-17' plus 4360.9 feet, Long. 79°-55' plus 1729.7 feet; thence,

3. To the Canal bank opposite Canal Station 308 plus 10; thence,

4. Southerly along the Canal to a point opposite the next monument; thence,

5. Easterly to a $1\frac{1}{2}$ " g. i. pipe monument, 125 feet east of the bank of the Canal, in Lat. 9°-17' plus 1290.6 feet, Long. 79°-55' plus 2205.9 feet (said monument being 1390 feet north of the north end of the north approach wall of Gatun locks); thence,

6. N. 89°-41' E., 537.7 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, in Lat. 9°-17' plus 1293.6 feet, Long. 79°-55' plus 1668.2 feet; thence,

7. S. 12°-10' E., 2705.4 feet, to a bolt, set in concrete platform of an oil tank, in Lat. 9°-16' plus 4696.5 feet, Long. 79°-55' plus 1098.0 feet; thence,

8. Following the road (direct course and distance S. 87°-02' E., 533.4 feet) to a $1\frac{1}{2}$ " g. i. pipe monument, in Lat. 9°-16' plus 4668.9 feet, Long. 79°-55' plus 565.6 feet; thence,

9. Following the road (direct course and distance S. 66°-54' E., 185.3 feet) to the point of beginning.

All pipe monuments are painted white.

All bearings refer to the true meridian.

No structure shall be constructed by the military authorities within two hundred (200) feet of the present banks of the Canal.

The transfer of the Fort William D. Davis Reservation is made subject to the continued right of the Supply Department of the Panama Canal to use areas not contiguous to barracks or quarters for pasturage of cattle for the supply of beef to the Canal Zone; the pasturage areas, however, to be available for use by the troops when required for military maneuvers or for target practice.

WOODROW WILSON.

THE WHITE HOUSE,
22 December, 1919.

[No. 3203.]

EXECUTIVE ORDER.

The area of land hereinafter described, situated in the Canal Zone, consisting of two parcels, which include FORT CLAYTON, THE PANAMA ARSENAL, THE ENGINEER DEPOT, and the POST OF COROZAL, is hereby set apart and assigned to the uses and purposes of a military reservation under the jurisdiction of the Secretary of War; but said area shall be subject to the civil control and jurisdiction of the Governor of the Panama Canal, in conformity with the Panama Canal Act.

The boundaries of said reservation are described as follows:

The boundary of the first parcel begins at a $1\frac{1}{2}$ " galvanized iron pipe monument, on the Canal Zone boundary line between monuments No. 88 and No. 89, the coordinates of whose position are Lat. $9^{\circ}-01'$ plus 6040.5 feet, Long. $79^{\circ}-31'$ plus 3587.5 feet; thence,

1. N. $89^{\circ}-57'$ W., 215.4 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the west side of a trail, in Lat. $9^{\circ}-01'$ plus 6040.7 feet, Long. $79^{\circ}-31'$ plus 3802.9 feet; thence,

2. N. $89^{\circ}-57'$ W., 251.5 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the east bank of a branch of the Rio Abajo, in Lat. $9^{\circ}-01'$ plus 6041.0 feet, Long. $79^{\circ}-31'$ plus 4054.4 feet; thence,

3. N. $89^{\circ}-57'$ W., 1265.7 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the east side of the Porto Bello trail, in Lat. $9^{\circ}-01'$ plus 6042.1 feet, Long. $79^{\circ}-31'$ plus 5320.1 feet; thence,

4. N. $89^{\circ}-57'$ W., 838.4 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the east side of the Macambo trail, in Lat. $9^{\circ}-01'$ plus 6042.8 feet, Long. $79^{\circ}-32'$ plus 146.1 feet; thence,

5. N. $89^{\circ}-57'$ W., 2051.4 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a ridge in Lat. $9^{\circ}-01'$ plus 6044.5 feet, Long. $79^{\circ}-32'$ plus 2197.5 feet; thence,

6. N. $89^{\circ}-57'$ W., 2946.1 feet, to a concrete monument, on a high hill, in Lat. $9^{\circ}-01'$ plus 6047.0 feet, Long. $79^{\circ}-32'$ plus 5143.6 feet; thence,

7. N. $89^{\circ}-57'$ W., 2509.1 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a hill, in Lat. $9^{\circ}-02'$ plus 1.7 feet, Long. $79^{\circ}-33'$ plus 1640.6 feet; thence,

8. N. $89^{\circ}-57'$ W., 1363.1 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a hill, in Lat. $9^{\circ}-02'$ plus 2.8 feet, Long. $79^{\circ}-33'$ plus 3003.7 feet; thence,

9. N. $89^{\circ}-57'$ W., 1267.7 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the east side of a trail running along the east bank of the Rio Cardenas, in Lat. $9^{\circ}-02'$ plus 3.9 feet, Long. $79^{\circ}-33'$ plus 4271.4 feet; thence,

10. N. $89^{\circ}-57'$ W., 200.5 feet, to a concrete monument, on the west bank of the Rio Cardenas, in Lat. $9^{\circ}-02'$ plus 4.0 feet, Long. $79^{\circ}-33'$ plus 4471.9 feet; thence,

11. N. $89^{\circ}-57'$ W., 392.6 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a hill, in Lat. $9^{\circ}-02'$ plus 4.4 feet, Long. $79^{\circ}-33'$ plus 4864.5 feet; thence,

12. N. $89^{\circ}-57'$ W., 1255.2 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, in Lat. $9^{\circ}-02'$ plus 5.5 feet, Long. $79^{\circ}-34'$ plus 107.6 feet; thence,

13. N. $89^{\circ}-57'$ W., 172.8 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, in Lat. $9^{\circ}-02'$ plus 5.6 feet, Long. $79^{\circ}-34'$ plus 280.4 feet; thence,

14. N. $89^{\circ}-57'$ W., 1222.2 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, concreted into the rock bed of a branch of the Rio Guanabano, in Lat. $9^{\circ}-02'$ plus 6.6 feet, Long. $79^{\circ}-54'$ plus 1502.6 feet; thence,

15. N. $89^{\circ}-57'$ W., 885.8 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a rocky hill, in Lat. $9^{\circ}-02'$ plus 7.3 feet, Long. $79^{\circ}-34'$ plus 2388.4 feet; thence,

16. N. $89^{\circ}-57'$ W., 2139.5 feet, to a concrete monument, on the west bank of the Rio Guanabano, in Lat. $9^{\circ}-02'$ plus 9.1 feet, Long. $79^{\circ}-34'$ plus 4527.9 feet; thence,

17. N. $89^{\circ}-57'$ W., 1014.4 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the west side of the Cruces trail, in Lat. $9^{\circ}-02'$ plus 9.9 feet, Long. $79^{\circ}-34'$ plus 5542.3 feet; thence,

18. N. $89^{\circ}-57'$ W., 1417.8 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the west side of a military trail, in Lat. $9^{\circ}-02'$ plus 11.1 feet, Long. $79^{\circ}-35'$ plus 948.0 feet; thence,

19. N. $89^{\circ}-57'$ W., 965.0 feet, to a concrete monument, on the east bank of the Rio Cameron, in Lat. $9^{\circ}-02'$ plus 11.9 feet, Long. $79^{\circ}-35'$ plus 1913.0 feet; thence,

20. N. $89^{\circ}-57'$ W., 2384.9 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the nose of a high hill, in Lat. $9^{\circ}-02'$ plus 13.8 feet, Long. $79^{\circ}-35'$ plus 4297.9 feet; thence,

21. N. $89^{\circ}-57'$ W., 1634.1 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on a hill, in Lat. $9^{\circ}-02'$ plus 15.2 feet, Long. $79^{\circ}-35'$ plus 5932.0 feet; thence,

22. N. $89^{\circ}-57'$ W., 796.5 feet, to a $1\frac{1}{2}$ " g. i. pipe monument, on the east bank of the Rio Caimitillo, in Lat. $9^{\circ}-02'$ plus 15.9 feet, Long. $79^{\circ}-36'$ plus 716.4 feet; thence,

23. Southerly along center line of the Rio Caimitillo and the center line of an arm of Miraflores Lake, to a copper plug, set in the north curb of the Pedro Miguel-Corozal road, in Lat. $9^{\circ}-00'$ plus 5429.6 feet, Long. $79^{\circ}-36'$ plus 219.8 feet; thence,

24. Southeasterly along this curb of the Pedro Miguel-Corozal road to a copper plug, in the east curb of the road nearly opposite transmission bridge 42.8 at Miraflores railroad station, in Lat. $9^{\circ}-00'$ plus 1504.4 feet, Long. $79^{\circ}-35'$ plus 2713.5 feet; thence,

25. S. $35^{\circ}-38'$ E., 47.3 feet, along a 100-foot offset line from the center line between main tracks of the Panama Railroad, to a copper plug, in the westerly curb of the

Pedro Miguel-Corozal road, in Lat. $9^{\circ}-00'$ plus 1465.9 feet, Long. $79^{\circ}-35'$ plus 2685.9 feet; thence,

26. Southerly along a line parallel with and 100 feet easterly from the center line between main tracks of the Panama Railroad to a $1\frac{1}{2}''$ g. i. pipe monument, on the boundary of the Corozal Hospital Farm, in Lat. $8^{\circ}-59'$ plus 2459.3 feet, Long. $79^{\circ}-34'$ plus 5080.9 feet; thence,

27. N. $47^{\circ}-14'$ E., 746.5 feet, to the Corozal Hospital Farm Monument No. 10, in Lat. $8^{\circ}-59'$ plus 2966.2 feet, Long. $79^{\circ}-34'$ plus 4532.8 feet; thence,

28. N. $47^{\circ}-14'$ E., 500.9 feet, to concrete monument No. 9 of the Hospital Farm, on west side of the old Corozal road, in Lat. $8^{\circ}-59'$ plus 3306.3 feet, Long. $79^{\circ}-34'$ plus 4165.1 feet; thence,

29. N. $47^{\circ}-14'$ E., 41.1 feet, to concrete monument No. 8 of the Hospital Farm, on east side of the old Corozal road, in Lat. $8^{\circ}-59'$ plus 3334.2 feet, Long. $79^{\circ}-34'$ plus 4134.9 feet; thence,

30. Northerly along the east edge of the old Corozal road to a copper plug, set in the southeast corner of a concrete bridge over the Rio Cardenas, in Lat. $9^{\circ}-00'$ plus 212.8 feet, Long. $79^{\circ}-34'$ plus 3425.2 feet; thence,

31. S. $43^{\circ}-32'$ E., 1666.3 feet, to concrete monument No. 7 of the Hospital Farm, on a high hill, in Lat. $8^{\circ}-59'$ plus 5052.0 feet, Long. $79^{\circ}-34'$ plus 2277.6 feet; thence,

32. S. $74^{\circ}-28'$ E., 1297.6 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, on a hill, in Lat. $8^{\circ}-59'$ plus 4704.5 feet, Long. $79^{\circ}-34'$ plus 1027.4 feet; thence,

33. S. $8^{\circ}-31'$ E., 2777.0 feet, to a stone slab monument, on Cerro Corozal, No. 4 of the Hospital Farm, in Lat. $8^{\circ}-59'$ plus 1958.1 feet, Long. $79^{\circ}-34'$ plus 616.2 feet; thence,

34. S. $47^{\circ}-14'$ W., 1453.7 feet, to a concrete monument, "I. C. C." of the Hospital Farm, in Lat. $8^{\circ}-59'$ plus 971.3 feet, Long. $79^{\circ}-34'$ plus 1683.7 feet; thence,

35. S. $85^{\circ}-31'$ W., 450.7 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-59'$ plus 936.1 feet, Long. $79^{\circ}-34'$ plus 2133.0 feet; thence,

36. N. $80^{\circ}-42'$ W., 546.6 feet, along a wire fence to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-59'$ plus 1024.4 feet, Long. $79^{\circ}-34'$ plus 2672.4 feet; thence,

37. S. $23^{\circ}-11'$ W., 357.3 feet, along a hedge, to a point, at bend of hedge, in Lat. $8^{\circ}-59'$ plus 693.4 feet, Long. $79^{\circ}-34'$ plus 2813.1 feet; thence,

38. S. $47^{\circ}-40'$ W., 151.1 feet, along a hedge, to a $1\frac{1}{2}''$ g. i. pipe monument, on easterly edge of road in front of chapel, in Lat. $8^{\circ}-59'$ plus 591.6 feet, Long. $79^{\circ}-34'$ plus 2924.8 feet; thence,

39. N. $21^{\circ}-04'$ W., 121.7 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, on west side of road to Hospital Farm, in Lat. $8^{\circ}-59'$ plus 705.2 feet, Long. $79^{\circ}-34'$ plus 2968.5 feet; thence,

40. N. $58^{\circ}-29'$ W., 258.0 feet, along a hedge, to a $1\frac{1}{2}''$ g. i. pipe monument, on west side of the old Corozal road, in Lat. $8^{\circ}-59'$ plus 840.1 feet, Long. $79^{\circ}-34'$ plus 3188.5 feet; thence,

41. S. $35^{\circ}-00'$ W., 202 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-59'$ plus 674.5 feet, Long. $79^{\circ}-34'$ plus 3304.4 feet; thence,

42. N. $41^{\circ}-06'$ W., 550 feet, along northeast curb of the Pedro Miguel-Corozal road, to a copper plug, in curb, in Lat. $8^{\circ}-59'$ plus 1069.5 feet, Long. $79^{\circ}-34'$ plus 3687.2 feet; thence,

43. S. $37^{\circ}-27'$ W., 192.9 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-59'$ plus 916.4 feet, Long. $79^{\circ}-34'$ plus 3804.5 feet; thence,

44. Southeasterly along a line parallel with and 100 feet northeasterly from the center line between main tracks of the Panama Railroad, to a $1\frac{1}{2}''$ g. i. pipe monument, at north corner of Army Commissary, in Lat. $8^{\circ}-59'$ plus 505.8 feet, Long. $79^{\circ}-34'$ plus 3250.7 feet; thence,

45. S. $39^{\circ}-54'$ W., 70 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, at west corner of Army Commissary, in Lat. $8^{\circ}-59'$ plus 452.8 feet, Long. $79^{\circ}-34'$ plus 3295.6 feet; thence,

46. S. $51^{\circ}-18'$ E., 269 feet, along a line parallel with and 30 feet distant from the center line between main tracks of the Panama Railroad, to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-59'$ plus 284.6 feet, Long. $79^{\circ}-34'$ plus 3085.7 feet; thence,

47. N. $40^{\circ}-10'$ E., 70 feet, to a $1\frac{1}{2}''$ pipe monument, on easterly side of Corozal road, in Lat. $8^{\circ}-59'$ plus 338.1 feet, Long. $79^{\circ}-34'$ plus 3040.5 feet; thence,

48. Southerly along a line parallel with and 100 feet easterly from the center line between main tracks of the Panama Railroad, to a copper plug, set in south curb on concrete road to Engineer Supply Depot, in Lat. $8^{\circ}-58'$ plus 4637.4 feet, Long. $79^{\circ}-34'$ plus 1774.6 feet; thence,

49. S. $17^{\circ}-19'$ E., 175.1 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, in front of Signal Corps Supply Depot, in Lat. $8^{\circ}-58'$ plus 4470.2 feet, Long. $79^{\circ}-34'$ plus 1722.5 feet; thence,

50. S. $37^{\circ}-34'$ E., 574.1 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, at north side of corral, in Lat. $8^{\circ}-58'$ plus 4015.1 feet, Long. $79^{\circ}-34'$ plus 1372.5 feet; thence,

51. Southerly along a line parallel with and 100 feet easterly from the center line between main tracks of the Panama Railroad to a $1\frac{1}{2}''$ g. i. pipe monument, opposite

transmission bridge 45-2, in Lat. $8^{\circ}-58'$ plus 2213.8 feet, Long. $79^{\circ}-34'$ plus 210.5 feet; thence,

52. Southeasterly along a line parallel with and 15 feet northeasterly from the Miraflores-Balboa water mains to a $2''$ g. i. pipe monument, in Lat. $8^{\circ}-57'$ plus 5043.3 feet, Long. $79^{\circ}-33'$ plus 3364.3 feet; thence,

53. N. $40^{\circ}-00'$ E., 2209.3 feet, along a line parallel with and 500 feet northwesterly from center line between main tracks of the Panama Railroad, to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-58'$ plus 688.3 feet, Long. $79^{\circ}-33'$ plus 1944.2 feet; thence,

54. N. $89^{\circ}-24'$ E., 1203.1 feet, along a line parallel with and 500 feet northerly from center line between main tracks of the Panama Railroad, to a copper plug, set in concrete closed conduit over the Rio Corundu, in Lat. $8^{\circ}-58'$ plus 700.9 feet, Long. $79^{\circ}-33'$ plus 739.2 feet; thence,

55. Northerly along the Rio Corundu and the Canal Zone boundary to the point of beginning.

The boundary of the second parcel begins at channel light No. 10 on east bank of Panama Canal near P. 1, 2094 plus 98.2; thence,

1. N. $64^{\circ}-40'$ E., 670.1 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, 6 feet southwesterly from southwesterly rail of track to Miraflores Locks at southeasterly end of trestle over Rio Grande Diversion, in Lat. $8^{\circ}-59'$ plus 2350.6 feet, Long. $79^{\circ}-34'$ plus 5890.1 feet; thence,

2. S. $54^{\circ}-10'$ E., 668.5 feet, along railroad embankment to a $1\frac{1}{2}''$ g. i. pipe monument, 6 feet southwesterly from southwesterly rail at northwesterly end of passing track, in Lat. $8^{\circ}-59'$ plus 1959.2 feet, Long. $79^{\circ}-34'$ plus 5348.1 feet; thence,

3. S. $49^{\circ}-51'$ E., 1289.6 feet, along railroad embankment to a $1\frac{1}{2}''$ g. i. pipe monument, 6 feet southwesterly from southwesterly rail of spur to lock machinery storage platform, in Lat. $8^{\circ}-59'$ plus 1127.7 feet, Long. $79^{\circ}-34'$ plus 4362.4 feet; thence,

4. S. $23^{\circ}-52'$ E., 351.9 feet to a copper plug, set in northwest corner of the above described concrete platform, in Lat. $8^{\circ}-59'$ plus 805.9 feet, Long. $79^{\circ}-34'$ plus 4220.0 feet; thence,

5. By a curve along west edge of the above described concrete platform to a copper plug set in southwest corner of platform, in Lat. $8^{\circ}-59'$ plus 521.4 feet, Long. $79^{\circ}-34'$ plus 4021.8 feet; thence,

6. N. $39^{\circ}-43'$ E., 301.9 feet to a $1\frac{1}{2}''$ g. i. pipe monument, at bottom of railroad cut at transmission bridge 43-18, in Lat. $8^{\circ}-59'$ plus 753.6 feet, Long. $79^{\circ}-34'$ plus 3828.8 feet; thence,

7. Southeasterly along a line parallel with and 45 feet southwesterly from center line between main tracks of the Panama Railroad to a $1\frac{1}{2}''$ g. i. pipe monument, near spur to Ordnance Depot, in Lat. $8^{\circ}-58'$ plus 5852.3 feet, Long. $79^{\circ}-34'$ plus 2740.7 feet; thence,

8. S. $22^{\circ}-13'$ E., 260.7 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, in fork between two draining ditches, in Lat. $8^{\circ}-58'$ plus 5610.9 feet, Long. $79^{\circ}-34'$ plus 2612.1 feet; thence,

9. S. $32^{\circ}-53'$ E., 820.3 feet, along a line parallel with and 100 feet westerly from center line between main tracks of the Panama Railroad, to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-58'$ plus 4922.0 feet, Long. $79^{\circ}-34'$ plus 2196.7 feet; thence,

10. N. $57^{\circ}-13'$ E., 62.7 feet, to concrete monument No. 7 on the old Engineer Depot reservation, in Lat. $8^{\circ}-58'$ plus 4955.9 feet, Long. $79^{\circ}-34'$ plus 2143.9 feet; thence,

11. S. $32^{\circ}-45'$ E., 501.0 feet, to concrete monument No. 1 of the Engineer Depot Reservation, in Lat. $8^{\circ}-58'$ plus 4534.5 feet, Long. $79^{\circ}-34'$ plus 1872.9 feet; thence,

12. S. $32^{\circ}-45'$ E., 576 feet, to concrete monument No. 2 of the Engineer Depot reservation, in Lat. $8^{\circ}-58'$ plus 4050.1 feet, Long. $79^{\circ}-34'$ plus 1561.3 feet; thence,

13. S. $32^{\circ}-45'$ E., 196.9 feet, to a $1\frac{1}{2}''$ g. i. pipe monument, in Lat. $8^{\circ}-58'$ plus 3884.5 feet, Long. $79^{\circ}-34'$ plus 1451.8 feet; thence,

14. Due west to the east bank of the Panama Canal; thence,

15. Northerly along the east bank of the Panama Canal to the point of beginning.

All bearings refer to the true meridian.

All pipe monuments are painted white and stenciled in black "Mil. Res." where the boundary lines intersect the sides of the pipe.

No structure shall be constructed by the military authorities within two hundred (200) feet of the present banks of the Canal.

The transfer of the reservation including Fort Clayton, The Panama Arsenal, The Engineer Depot, and the Post of Corozal is made subject to the continued right of the Supply Department of the Panama Canal to use areas not contiguous to barracks or quarters for pasturage of cattle for the supply of beef to the Canal Zone, the pasturage areas, however, to be available for use by the troops when required for military maneuvers or for target practice.

WOODROW WILSON.

THE WHITE HOUSE,
30 December, 1919.

[Nc. 3207.]

EXECUTIVE ORDER

ESTABLISHING REGULATIONS FOR THE CANAL ZONE RELATIVE TO THE SALE, POSSESSION, AND DISPOSITION OF LIQUORS FOR SACRAMENTAL, SCIENTIFIC, INDUSTRIAL, PHARMACEUTICAL, AND MEDICINAL PURPOSES.

By virtue of the authority vested in me by Section 20 of the Act of Congress entitled "An Act To prohibit intoxicating beverages, and to regulate the manufacture, production, use and sale of high-proof spirits for other than beverage purposes, and to insure an ample supply of alcohol and promote its use in scientific research and in the development of fuel, dye, and other lawful industries," effective October 28, 1919, I hereby establish the following regulations for the Canal Zone.

SECTION 1. The Chief Health Officer of The Panama Canal, under the direction of the Governor of The Panama Canal, is hereby authorized and directed to administer the regulations established hereunder; and he may designate one or more assistants to aid him in the performance of his duties, who shall exercise such powers as the Chief Health Officer may delegate to them from time to time.

SECTION 2. In conformity with Section 1, Title II, of the above-mentioned Act of Congress, the word "liquor" when used in these regulations, shall be construed to include alcohol, brandy, whiskey, rum, gin, beer, ale, porter and wine, and in addition thereto any spiritous, vinous, malt, or fermented liquors, liquids and compounds, whether medicated, proprietary, patented or not, and by whatever name called, containing one-half of one per cent or more of alcohol by volume, which are fit for use for beverage purposes: *Provided*, That the foregoing definition shall not extend to dealcoholized wine or to any beverage or liquid produced by the process by which beer, ale, porter or wine is produced, if it contain less than one-half of one per cent of alcohol by volume. and is otherwise denominated than as beer, ale, or porter.

In conformity with Section 1, Title III, of the above-mentioned Act of Congress, the term "alcohol" means that substance known as ethyl alcohol, hydrated oxide of ethyl, or spirit of wine, from whatever source or whatever processes produced.

SECTION 3. No liquors for sacramental purposes shall be imported into the Canal Zone or possessed, used, or disposed of therein for that purpose except upon the written permit of the Chief Health Officer or his duly authorized assistant. The permit shall not be issued except upon a written application of a priest or other minister of the gospel, rabbi, or official of any religious sect residing within the Canal Zone. The application shall be dated, shall state the name of the applicant in full, his official position, his church or institution, and where it is located, and that he desires to import into the Canal Zone and use the liquors described in the application for sacramental purposes only, giving the quantity thereof, where he is to obtain the same, and how it is to be transported into the Canal Zone. The application shall state that the liquor applied for will be necessary to cover the sacramental use thereof by the applicant's church or congregation for a period of days to be stated in the application, and that he will undertake to the best of his ability to see that none of the liquor applied for shall be used for other than sacramental uses; and he shall also state the quantity, approximately, of any liquor he then has on hand for sacramental purposes. The application shall be signed by the applicant, and shall state his address for shipment purposes.

If, in the opinion of the Chief Health Officer, the application should be granted, he will endorse his approval thereon and sign the same officially and deliver it to the applicant; and the Chief Health Officer shall keep a record of each permit issued by him or his assistants.

SECTION 4. No physician in the Canal Zone not employed by the Health Department of the Canal, the Army, Navy, or Public Health Service of the United States, shall be authorized to prescribe liquor to any patient unless the physician holds a permit issued by the Chief Health Officer of The Panama Canal; and all such permits shall be in writing, giving the date of issue, the name and address of the person to whom it was issued, and shall designate and limit the acts which are permitted, and the time and place where such acts may be performed. The permit shall be signed by the Chief Health Officer or his authorized assistant, and shall be delivered to the applicant; and the Chief Health Officer shall keep a record of each permit so issued by him or his assistant. No permit shall be required under this section from a physician in the employ of The Panama Canal, the Army, Navy, or Public Health Service of the United States.

SECTION 5. No one but a physician, authorized to do so under the preceding section, shall be permitted to prescribe liquors for medicinal purposes in the Canal Zone, and no liquors shall be so prescribed except after careful physical examination of the person for whose use such prescription is sought, or if such examination is found impracticable, then only when upon the best information obtainable the physician believes that

the issue of such liquor to such person is necessary and will afford him relief from some known ailment. A prescription issued bona fide under these regulations shall authorize the person named in the same to use and possess the liquor described in the prescription, and in the quantity and for the time therein stated.

SECTION 6. No prescription issued by a physician not a resident of the Canal Zone shall authorize the introduction into the Canal Zone, or the use or possession therein, of any liquor, unless such prescription shall have been approved by the Chief Health Officer or one of his assistants.

SECTION 7. No druggist or pharmacist not in the employ of the Health Department of The Panama Canal or the Army, Navy, or Public Health Service of the United States, shall be authorized to issue liquors upon a physician's prescription, unless such druggist or pharmacist holds a written permit from the Chief Health Officer or one of his duly authorized assistants, and then only in the form and manner authorized by such written permit. No permit shall be required under this section from a druggist or pharmacist in the employ of The Panama Canal, or the Army, Navy, or Public Health Service of the United States.

SECTION 8. No liquors obtained outside of the Canal Zone shall be permitted to enter the Canal Zone, or to be possessed or used therein for sacramental, pharmaceutical, medicinal, industrial or scientific purposes except with the approval of the Chief Health Officer or his assistants and such approval shall not be given unless such officer is satisfied that the liquor is intended to be used for the purposes enumerated in this section, and in conformity with the law and the regulations.

SECTION 9. No liquor shall be manufactured for sacramental, medicinal, pharmaceutical, scientific, or industrial purposes, except in the laboratories of The Panama Canal; and no liquors shall be used for sacramental, medicinal, or pharmaceutical purposes except in the manner hereinbefore described; and no liquors shall be used for scientific or industrial purposes except upon authorization of the Chief Health Officer. The Chief Health Officer is hereby authorized and directed to issue, from time to time, such instructions as are not inconsistent with law, for the manufacture and use of liquors under these regulations.

SECTION 10. The articles enumerated in this section, after having been manufactured and prepared for market, shall not be subject to the provisions of these regulations, if they correspond with the following descriptions and limitations, viz:

(a) Denatured alcohol or denatured rum produced and used as provided by the laws and regulations of the United States, now or hereafter in force.

(b) Medicinal preparations manufactured in accordance with formulas prescribed by the United States Pharmacopeia, National Formulary, or the American Institute of Homeopathy that are unfit for use for beverage purposes.

(c) Patented, patent, and proprietary medicines that are unfit for use for beverage purposes.

(d) Toilet, medicinal, and antiseptic preparations and solutions that are unfit for use for beverage purposes.

(e) Flavoring extracts and sirups, that are unfit for use as a beverage, or for intoxicating beverage purposes.

(f) Vinegar and preserved sweet cider.

The manufacture and preparation of such said articles, however, shall be subject to such conditions as the Chief Health Officer may impose.

SECTION 11. The Chief Health Officer may from time to time require any and all persons having in their possession any liquor for sacramental, medicinal, pharmaceutical, scientific, or industrial purposes, to submit a statement to him showing the amount of such liquor in their possession; and he is hereby authorized to issue from time to time such instructions as he may deem necessary to fully carry out these regulations, including instructions regarding the use of liquors by veterinarians employed by The Panama Canal and other departments of the Government of the United States.

SECTION 12. Each and every violation of any of the provisions of these regulations shall be punished by a fine of not more than \$1,000 and imprisonment of not exceeding six months for a first offense, and by a fine of not less than \$200 or more than \$2,000 and imprisonment of not less than one month nor more than five years for a second and subsequent offense, to be imposed by the District Court of the Canal Zone.

SECTION 13. These regulations shall be effective from and after this date.

WOODROW WILSON.

THE WHITE HOUSE,
7 January, 1920.

[No. 3210.]

EXECUTIVE ORDER.

An Executive order concerning costs and security for costs in the district court and the magistrates' courts in the Panama Canal Zone.

By virtue of the authority vested in me by "An Act to provide for the opening, maintenance, protection and operation of The Panama Canal, and the sanitation and government of the Canal Zone," approved August 24, 1912, known as the "Panama Canal Act," I hereby establish and prescribe the following rules of practice to govern the District Court and the Magistrates' Courts in the Panama Canal Zone:

Section I. Each party to any civil suit instituted in the District Court or any Magistrate court of the Canal Zone shall be responsible for the costs incurred by him in such suit, and the marshal, constable or other officer, authorized to execute any process in such cases, shall not execute the same unless the fees allowed by law for the service of such process shall be paid in advance by the party seeking such process, unless such party to the suit is entitled to prosecute the same in forma pauperis, as hereinafter provided.

Section II. The plaintiff in every civil case in the District Court shall deposit with the clerk thereof a docket fee of ten dollars in cash and every plaintiff instituting a suit in the Magistrate courts shall deposit a docket fee in said court of five dollars; and the suit shall not be filed by the clerk or the magistrate unless the said docket fee is paid in the manner herein provided. The monies to be deposited shall be applied to the payment of costs as they accrue.

Section III. Any party to a civil case in the District Court, who demands a trial by jury, shall accompany said demand with a deposit of ten dollars as a jury fee; and unless such deposit is made, the case shall be tried without the intervention of a jury.

Section IV. The plaintiff in any civil suit or proceedings in the District Court or in either of the Magistrate courts may be ruled to give security for the costs upon motion of the opposing party or of any officer of the court interested in the costs accruing in said suit; and it shall be the duty of the court to require the plaintiff to give such security for costs within a reasonable time thereafter and not later than ten days after the motion is presented to the court; and if the plaintiff shall fail to comply with the order of the court within the time prescribed by the court or judge thereof, the suit shall be dismissed.

Section V. A new or additional undertaking may be ordered, within such time as the court or judge may prescribe, upon proof that the original undertaking is insufficient security, and failure on the part of the plaintiff to comply with the order of the court, or judge, within the time prescribed, shall cause the dismissal of the suit.

The security for costs required by this section may consist of a money deposit, bond of a surety company, or cost bond with two or more good and sufficient sureties; the form of such security to be determined by the judge or magistrate of the court before whom the proceedings are pending. If personal security is furnished, the sureties must be residents of the Canal Zone, and no officer of the court or attorney practicing before the court shall be accepted as surety.

Section VI. All bonds given as security for costs shall authorize judgment against all of the obligors of the said bonds, jointly and severally, for such costs, to be entered in the final judgment of the case or special proceedings.

Section VII. Any citizen of the United States, entitled to commence any suit or action in any court in the Canal Zone, may commence and prosecute or defend to conclusion any such suit or action, without being required to prepay fees or costs or give security therefor, before or after bringing such suit or action, upon filing in the said court a statement, under oath, in writing, that because of his poverty he is unable to pay the costs of said suit or action, or to give security for same, and that he believes that he is entitled to the redress he seeks by such suit or action, and setting forth the nature of the said cause of action.

The opposing party in the suit, the clerk of the District Court or his assistant, or the magistrate, as the case may be, may contest the inability of the party to pay costs or his inability to furnish security for same; and the contest shall be heard at such time as the court or magistrate may determine.

If no contest is made upon the affidavit, or if the same is admitted by the court or magistrate after the contest, it shall be the duty of the officers of the court thereafter to issue and serve all processes and perform all duties on behalf of such party as in other cases.

Section VIII. No security for costs shall be required of the United States, The Panama Canal, or any of its dependencies or from the public administrator of The Panama Canal.

Section IX. The provisions of this order, relating to security for costs, shall apply to an intervenor; and shall also apply to a defendant who seeks a judgment against the plaintiff on a counterclaim, after the defendant shall have discontinued his suit.

Section X. When the costs are secured by the provisions of an attachment or other bond, filed by the party required to give satisfactory security for costs, no further security shall be required.

Section XI. This order shall apply to pending cases in the District Court and the Magistrate courts.

Section XII. Costs shall ordinarily be allowed to the prevailing party as a matter of course, but the court shall have power for special reasons to adjudge that either party shall pay the costs of an action, or that the same be divided as may be equitable.

Section XIII. The Executive Order of August 14, 1914, "To Require Security for Costs in Civil Cases," and all other laws, orders and decrees, or parts thereof, in conflict with this order, are hereby repealed.

Section XIV. This order shall take effect thirty days from this date.

WOODROW WILSON.

THE WHITE HOUSE,
9 January, 1920.

[No. 3213.]

EXECUTIVE ORDER.

By direction of the President, it is ordered:

That, effective February 2, 1920, Homer A. A. Smith, who has been appointed a member of the Joint Commission for the appraisalment and settlement of damages to property in the Canal Zone, in accordance with the provisions of Articles Six and Fifteen of the Convention between the United States and Panama, concluded November 18, 1903, be allowed Twenty-five (\$25) Dollars per day for his services, including all expenses: *Provided*, That he shall be granted free transportation over the Panama Railroad and such other transportation as may be necessary when traveling on official business on the Isthmus; he shall also be allowed the ordinary privileges of Government employees on the Isthmus, including employees' rates at the hotels of The Panama Canal or the Panama Railroad Company on the Isthmus.

In consideration of the fact that Mr. Smith will resign his position as Auditor of The Panama Canal to accept appointment as member of the Joint Commission, it is further ordered that upon the termination of such service Mr. Smith shall be reinstated to the position of Auditor of The Panama Canal without disturbance of his continuous service status; and he shall also have the right to leave earned during his present service year after reinstatement as Auditor of The Panama Canal.

BENEDICT CROWELL,
Acting Secretary of War.

WAR DEPARTMENT,
Washington, D. C., January 30, 1920.

EXECUTIVE ORDER.

Under authority of the Act of Congress, Chapter 78, Section 2, approved May 20, 1918, Executive Order No. 3091, dated May 24, 1919, is hereby amended so as to include The Panama Canal.

WOODROW WILSON.

THE WHITE HOUSE,
3 February, 1920.

[No. 3222.]

The following Executive Order No. 3091 is made applicable to The Panama Canal by the above order.

EXECUTIVE ORDER.

Under authority of the Act of Congress, Chapter 78, Section 2, approved May 20, 1918, it is hereby ordered that the Secretary of the Navy be and he hereby is authorized to transfer any or all vessels, boats, and auxiliary ships of the Navy classified as yachts, colliers, transports, tenders, supply ships, hospital ships, submarine chasers, patrol boats, motor boats, fishing vessels, and special types built, purchased or commandeered for a substantial consideration by the Navy subsequent to the declaration of Congress by joint resolution approved April 6, 1917, that war exists between the United States and Germany, and provided said vessels were built, purchased, or commandeered for the purposes of said war, and any other Executive Department of the Government is desirous of securing from the Navy Department such vessels, boats, and auxiliary

ships, or any of them, which are, in the opinion of the Secretary of the Navy, not necessary for the needs of the Navy, upon such terms as may be agreed to by the Executive Head of such Department and the Secretary of the Navy.

It is hereby further ordered that the Secretary of the Navy may in his discretion and upon such terms as may be agreed to by him and the Executive Head of any Executive Department desirous of obtaining same, transfer the materials and equipment of vessels, boats, and auxiliary ships of the Navy as above described, said materials and equipment consisting of masts, bowsprits, boats, anchors, tackle furniture, and all other necessities appertaining and belonging to such vessels boats, and auxiliary ships.

WOODROW WILSON.

THE WHITE HOUSE,
24 May, 1919.

[No. 3091.]

EXECUTIVE ORDER.

AUTHORIZING CHARGES FOR SERVICES RENDERED BY THE QUARANTINE DIVISION OF THE PANAMA CANAL.

By virtue of the authority vested in me, I hereby establish the following order for the Canal Zone:

I. The Governor of The Panama Canal is hereby authorized to establish, from time to time, a schedule of charges to cover services rendered by the Quarantine Division of The Panama Canal in the disinfection of vessels and their cargoes, for the transportation and subsistence of passengers while in quarantine, for placing guards aboard vessels when necessary, and for the inspection of vessels outside of the regular hours; which charges shall be paid to The Panama Canal by the person or interest receiving such service.

II. The ordinance of the Isthmian Canal Commission, enacted August 5, 1911, and approved by the Secretary of War August 22, 1911, "Providing for night quarantine inspection of vessels at the port of Colon," and all other laws, orders and regulations in conflict with this order are hereby repealed.

III. This order shall take effect from and after this date.

WOODROW WILSON.

THE WHITE HOUSE,
11 February, 1920.

[No. 3226.]

EXECUTIVE ORDER.

ESTABLISHING A MAXIMUM RATE OF PAY FOR ALIEN EMPLOYEES OF THE PANAMA CANAL AND THE PANAMA RAILROAD COMPANY ON THE ISTHMUS OF PANAMA.

By virtue of the authority vested in me by the Panama Canal Act, approved August 24, 1912, it is hereby ordered:

I. That the Executive Order of February 2, 1914, be so amended that paragraphs 6 and 20 thereof shall read as follows:

PARAGRAPH 6.

All employees who receive compensation at the rate of more than \$960 a year or 40 cents an hour, must be citizens of the United States or the Republic of Panama, and such citizens will be given preference for employment in all grades. Aliens may not be employed in such grades unless (a) they have occupied similar positions during the construction of the Canal for two years or more, or (b) in case of emergency, in which latter case they must be replaced by citizens of the United States or Republic of Panama as early as practicable.

PARAGRAPH 20.

All employees who are citizens of the United States, and aliens whose compensation is at a rate of more than \$960 a year or 40 cents an hour, shall be entitled to leave privileges.

II. This Order shall take effect on and after this date.

WOODROW WILSON.

THE WHITE HOUSE,
20 February, 1920.

[No. 3232.]

EXECUTIVE ORDER.

The area of land hereinafter described situated in the jurisdiction of the Canal Zone is hereby set apart and assigned to the uses and purposes of a radio station, and other naval purposes, under the control of the Secretary of the Navy; but the said area shall be subject to the civil jurisdiction of the Canal Zone authorities in conformity with the Panama Canal Act. The said area is described as follows:

PUNTA MALA NAVAL RADIO STATION.

The said radio station is part of the tract of land heretofore set apart for the uses and purposes of the Punta Mala Lighthouse of The Panama Canal, and comes within the following metes and bounds:

Commencing at the southernmost point of the said Radio Station, which point is designated on the blueprint herewith attached numbered 6030-2, dated June 18, 1919, and signed O. E. Malsbury, Assistant Engineer, as Point "B," and is marked by a concrete monument; thence north seventy degrees, ten minutes, thirty-one seconds ($N 70^{\circ} 10' 31''$) west, five hundred and seventy-eight feet ($578'$) more or less, to a concrete monument at the intersection of this line with the western boundary of the Punta Mala Lighthouse Reservation, designated on said blueprint with the letter "D"; thence north (true) six hundred and ten feet ($610'$), more or less, to the intersection with the low water shore line of the cove at the northern end of the Reservation. The line then follows the shore line of the cove to the northern end of the small point, thence following the low water shore line in a southerly direction until the point "F," shown on the blueprint, is reached. The line then runs south sixty-one degrees, three minutes, twenty-nine seconds ($S 61^{\circ} 03' 29''$) west, a distance of five hundred and eighty-nine and five tenths feet ($589.5'$) to the place of beginning marked "B" on the said blueprint. The total area of the Radio Station is approximately thirteen and seven tenths (13.7) acres.

The shelter cove at the northern boundary of the Radio Station which is used at high tide for landing supplies for the lighthouse as well as the Radio Station, shall be available for use of both the Lighthouse and Radio services, and a right of way is hereby allowed to Punta Mala Lighthouse service through the Naval Reservation for the purpose of transporting supplies to and from the Lighthouse Reservation and the said landing.

WOODROW WILSON.

THE WHITE HOUSE,
1 March, 1920.

[No. 3237.]

EXECUTIVE ORDER.

CARRYING AND KEEPING OF ARMS.

By virtue of the authority vested in me by Section 4 of the Act of Congress, authorizing the President to make rules and regulations relative to police powers in the Canal Zone, approved August 21, 1916, I hereby establish the following order for the Canal Zone.

SECTION I. It shall be unlawful for any one to carry on or about his person any firearm or any dirk, dagger or other knife, manufactured or sold for the purpose of offense or defense, or any slung shot, sword-cane, or any knuckles made of metal or other hard substance.

SEC. II. The preceding section shall not apply to a person engaged in the military or naval service of the United States, or a peace officer or officer authorized to execute judicial process of the United States or the Canal Zone, or in carrying mail or in the collection or custody of funds of the United States or the Canal Zone; nor to a member of a gun or pistol club organized for the promotion of target practice, a certified copy of the constitution and by-laws of which have been approved by the Executive Secretary of The Panama Canal and filed with the Chief of the Police and Fire Division, when such member is going to or from a target range or is engaged in practice at the target range. For the purposes of this order, a certificate of membership in the gun or pistol club shall be issued by the organization and approved by the Chief of the Police and Fire Division, which shall entitle the holder to carry firearms as is provided in this section.

Neither shall the preceding section apply to any person authorized to have or carry arms by permit granted under the terms of this order.

SEC. III. The Executive Secretary of The Panama Canal may authorize the granting of permits to have and carry arms, as follows:

1. To hunt upon the public lands of the Canal Zone or upon lands occupied by private persons, when authorized by the latter.

2. To have arms in residences, offices, business places, and plantations, and to watchmen or overseers of plantations, factories, warehouses, docks or piers. Applications for such permits shall be made to the Executive Secretary of The Panama Canal, and shall contain the full name, residence and occupation of the applicant; and if the applicant is a minor it shall not be granted without the consent of his parent or guardian; but no permit shall be granted to a minor under 15 years of age.

The Executive Secretary shall satisfy himself by due inquiry that the applicant is a proper person to have a permit to keep and carry arms; and he may grant or deny the application, as to him may seem proper.

SEC. IV. When an application is granted by the Executive Secretary for a permit to hunt, he shall endorse his approval thereon and file the application, and he shall cause a permit to be issued to the applicant upon his paying a fee of \$1.

Hunting permits issued by virtue of this order will allow the holder thereof to have, carry, and use firearms in the area or areas prescribed by the Governor of The Panama Canal, and on the conditions imposed by him under such general or special rules and regulations as he may issue from time to time. And the Governor is hereby empowered to designate the area or areas of the Canal Zone in which hunting is permitted, and the class of arms that may be used in hunting in such areas; and no hunting shall be allowed outside of the areas so designated by him. And the Governor of The Panama Canal may, in such general or special rules and regulations, impose such other conditions in respect to hunting as he may deem necessary in the interests of public order, and to prevent injury to persons or property.

A permit granted under this section shall run for the fiscal year in which it is issued, and it may be revoked at any time for cause by the Executive Secretary of The Panama Canal.

SEC. V. Permits heretofore issued by authority of law, to have and use firearms, shall not be affected by this order, but such permits shall continue in force until the expiration of the period for which they were issued.

SEC. VI. Any one not authorized by this order, who carries on or about his person any of the prohibited arms mentioned in Section I of this order, or who hunts or engages in hunting without first obtaining the permit provided for in this order, or who after obtaining such permit engages in hunting in violation of the provisions of this order or any rule or regulation established by the Governor hereunder, shall be punished by a fine not exceeding twenty-five dollars or by imprisonment in jail not to exceed thirty days, or by both such fine and imprisonment, in the court's discretion.

In addition to the punishment herein prescribed for a violation of this order, the courts shall adjudge the seizure and confiscation of the arms unlawfully had, used, or carried by the offending party, and the same shall be disposed of in such manner as the Executive Secretary of The Panama Canal shall determine.

SEC. VII. Penalties for the infringement of this order shall be in addition to such punishment as may be imposed upon the offending person for any other offense that he may have committed in connection with the carrying or using of arms in violation of this order.

SEC. VIII. The Executive Order of November 7, 1913, and all other laws, orders and regulations or parts thereof in conflict with this order are hereby repealed.

SEC. IX. This Order shall take effect thirty days from and after this date.

WOODROW WILSON.

THE WHITE HOUSE,
6 March, 1920.

[No. 3243.]

EXECUTIVE ORDER

ESTABLISHING MARITIME QUARANTINE REGULATIONS FOR THE CANAL ZONE AND HARBORS OF THE CITIES OF PANAMA AND COLON, REPUBLIC OF PANAMA.

By virtue of the authority vested in me by law, and in conformity with Article VII of the Panama Canal treaty between the United States of America and the Republic of Panama, dated November 18, 1903, I hereby establish the following maritime quarantine regulations for the Canal Zone, and for the harbors of the cities of Panama and Colon, Republic of Panama.

SECTION I.

The Division of Quarantine of the Panama Canal shall continue under the jurisdiction of the Health Department of the Panama Canal, subject to the supervision of the Governor of the Panama Canal.

SECTION II.

BILLS OF HEALTH.

Masters of vessels clearing from any foreign port or from any port in the possessions or other dependencies of the United States, or touching at any of the said ports, for a port in the Canal Zone or for the port of Panama or Colon, Republic of Panama, or for passage through the Panama Canal, must obtain a bill of health in duplicate from the officer or officers authorized by the quarantine laws and regulations in the United States to sign such certificates for vessels entering the ports of the United States.

SECTION III.

Vessels clearing from a foreign port for a port in the United States or one of their possessions or dependencies, and touching at any port of the Canal Zone, or the port of Panama or Colon, Republic of Panama, or for passage through the Panama Canal, shall not be required to obtain an additional bill of health under these regulations; but bills of health so obtained for entry into ports of the United States shall be presented upon arrival at any port of the Canal Zone or at the port of Panama or Colon, as the case may be, for the inspection of the Quarantine Officer of the Panama Canal.

SECTION IV.

Masters of vessels clearing from ports of the United States for ports of the Canal Zone or the port of Panama or Colon, Republic of Panama, or for passing through the Panama Canal, must obtain a port sanitary statement signed by the officer authorized under the laws of the United States to issue such statements, and must present such statement to the Quarantine Officer of the Panama Canal.

SECTION V.

RULES TO BE OBSERVED AT FOREIGN PORTS.

1. The officer issuing a bill of health at a foreign port or a port in any possession or other dependency of the United States shall satisfy himself, by inspection if necessary, that the conditions as certified to by him in said bill of health are true, and he is hereby authorized to withhold the bill of health to said vessel unless these regulations are complied with; and he shall note upon the face of the bill of health any additional facts that may guide the quarantine officer of the Panama Canal, in order that the latter may impose such restrictions as he may deem necessary on account of the insufficiency of the precautions taken at the port of departure of the vessel, or that he may allow such concessions as he may deem proper on account of the precautions taken at such port of departure.

2. Inspection is required of all vessels from ports in which cholera, yellow fever, or plague in men or rodents, prevails, or at which smallpox or typhus fever prevails in epidemic form and at which a medical officer is detailed.

3. The inspection required by this section is such an examination of the vessel, cargo, passengers, crew, personal effects of same, including the examination of manifests and other papers, food and water supply and the ascertainment of its relations with the shore, the manner of loading and possibilities of invasion by rats and insects as will enable the inspecting officer to determine if these regulations have been complied with.

4. The examination shall be made by daylight, as late as practicable before the ship sails. The vessel must be inspected before the passengers go aboard. The passengers shall be inspected just before embarkation, and the crew shall be inspected on the deck of the vessel; and no communication shall be had with the vessel after such inspection except by permission of the officer issuing the bill of health.

5. Before a bill of health is issued to a vessel having on board or having had on board a case of quarantinable disease or the infecting agents of any disease adequate measures must be taken to remove such infection.

6. Vessels must be mechanically clean in all their parts, especially the holds, fore-castle and steerage, prior to storing cargo therein or receiving passengers thereon. Any

portion of the vessel liable to have been infected by any quarantinable disease must be mechanically cleaned, and all bedding, linen, clothing, utensils and other articles that may have been used or soiled by the sick person must be removed and sterilized before the issuance of a bill of health.

7. Nothing containing organic refuse shall be taken as ballast from any port.

8. Bedding which has been used, upholstered furniture, wearing apparel, personal effects, and second-hand articles of a nature similar to those incorporated in this section, which the consular or medical officer has reason to believe have been soiled or that may carry lice, fleas, bed bugs, or other vermin, should be treated to correct this condition prior to shipment. Any article of the class mentioned in this paragraph, which can not be rendered clean and free from vermin, should not be shipped.

9. Passengers should avoid embarking, as far as possible, at a port where a quarantinable disease prevails; and communication between the vessel and the shore must be reduced to a minimum at ports where a quarantinable disease prevails, and the personnel of the vessel must remain on board during their stay in such port. No person suffering from a quarantinable disease shall be allowed to take passage on a vessel, except lepers with proper authority returning to their native country.

10. Passengers and crew, merchandise and baggage, coming from an infected locality, but shipped at an uninfected port, must submit to the same restrictions as are imposed at an infected port before being allowed to ship.

SECTION VI.

LOCAL RULES FOR INSPECTIONS.

1. The following vessels arrived at ports of the Canal Zone or the port of Panama or Colon, Republic of Panama, shall be inspected by the quarantine officer of the port prior to the vessel's entry:

(a) Vessels from foreign ports and from ports of the United States and their dependencies;

(b) Vessels with sickness on board;

(c) Vessels from Panamanian ports where quarantinable disease prevails;

(d) Vessels from Panamanian ports carrying passengers or articles suspected by the quarantine officers of conveying the infection of a communicable disease;

(e) Vessels from Panamanian ports having touched at a foreign port since the last quarantine inspection.

2. Every vessel subject to quarantine inspection shall be considered in quarantine until granted free pratique, and such vessel shall fly a yellow flag from the foremast head from sunrise to sunset, and shall observe all the other requirements of vessels actually quarantined.

3. The master of a vessel in quarantine shall allow no communication with his vessel except as is provided in these regulations, nor shall any water craft approach within 200 meters of such vessel.

4. No person or article of any kind shall be allowed to leave a vessel in quarantine except with the consent of the quarantine officer.

5. If a boat of any kind has communication with a vessel in quarantine, such boat and its personnel shall be subjected to such measures of quarantine as the quarantine officer may judge to be necessary.

6. No person other than the quarantine officers shall go aboard any vessel subject to quarantine until such vessel has been granted pratique, provided, however, that this section shall not apply to pilots, customs officers and admeasurers, while on duty; nor shall it apply to the agent of the vessel, if such agent has the consent of the quarantine officer to go aboard of such vessel.

7. The quarantine officer shall decide whether such vessel, or its personnel or passengers, or any article aboard of such vessel is liable to convey any of the following disease: Plague, yellow fever, cholera, smallpox, typhus fever, leprosy, or such other disease as may from time to time be declared to be quarantinable by the Governor of the Panama Canal; and if the quarantine officer is of the opinion that such vessel is liable to convey any of the said diseases, he shall place the vessel in quarantine, and shall forbid the entry of the said vessel until the vessel, in his judgment, is no longer liable to convey any such disease; and he shall take such measures in respect to the vessel, its passengers, personnel or cargo as in his judgment may be required to prevent the introduction of such disease into the Canal Zone or into the cities of Panama and Colon, Republic of Panama.

8. Every case of sickness aboard any vessel in the harbors of the Canal Zone or in the port of Panama or Colon shall be immediately reported by the master of the vessel to the quarantine officer.

SECTION VII.

GENERAL RULES.

Quarantine stations for the detention of passengers and others undergoing quarantine under these regulations shall be established and maintained at such places as may be fixed by the Governor of the Panama Canal from time to time; but the present quarantine stations of the Panama Canal shall continue until changed in conformity with the provisions of this section.

Quarantine inspections shall be made at the places and hours as may be fixed by the Governor from time to time; and he may, when necessary, designate quarantine anchorages to be used exclusively for quarantined vessels.

SECTION VIII.

In the discretion of the Chief Health Officer of the Panama Canal, passengers boarding vessels at ports subject to quarantine under these regulations may be required to present, upon their arrival at any port of the Canal Zone or the ports of Panama or Colon, to the quarantine officer, personal certificates from the officer authorized by these regulations to sign bills of health, which certificates should certify to the passenger's sanitary condition and history, provided, however, that due notice shall be given to the agents of the steamship company on the Isthmus of Panama that such certificates will be required.

SECTION IX.

The Chief Quarantine Officer shall have charge of the sanitation of the harbors of the Canal Zone and of the harbors of Panama and Colon, Republic of Panama, and vessels lying therein, and shall see that such measures are enforced as are necessary for the proper hygiene of vessels, their cargoes and personnel, whether in port or en route, and to prevent the vessels or their personnel from being a source of danger to other vessels or to the port. And he is hereby authorized to certify bills of health to vessels clearing from ports under his jurisdiction, setting forth in such bill of health the conditions of the port, vessel, its cargo, passengers and crew; and he is authorized, at the request of the master of any vessel, to disinfect the same and otherwise place such vessel in a sanitary condition so that it may leave the port with a clean bill of health and be able to make entry at the port of destination without further disinfection or detention in quarantine.

SECTION X.

The Governor of the Panama Canal is hereby authorized to establish a schedule of charges from time to time to cover services rendered by the quarantine division of the Panama Canal in the disinfection of vessels, their cargoes, for the transportation and subsistence of passengers while in quarantine, for placing guards aboard vessels when necessary, and for the inspection of vessels outside of regular hours, which charges shall be paid to the Panama Canal by the person or interest receiving such service.

SECTION XI.

A certificate from the quarantine officer shall be required of every vessel subject to inspection, as a prerequisite for the customs entry or passage through the Canal of such vessel; and any instructions written into this certificate shall be binding upon the vessel and shall be observed by all persons. The certificate provided for by this section shall be in either of the following forms:

(a) That the vessel has complied with all the quarantine regulations and is entitled to free pratique;

(b) That the vessel is allowed to proceed under certain conditions and is entitled to conditional pratique.

SECTION XII.

Persons detained in quarantine under these regulations shall not be permitted to go outside of the limits of the quarantine station without permission of the quarantine officer, and if any such person shall leave the quarantine station without such permission he may be taken into custody by the quarantine officer wherever found and returned to the quarantine station, and for this purpose the quarantine officer may call upon the police for assistance.

No person except the Chief Health Officer of the Panama Canal or his representatives, the quarantine officers and employees and personnel of the station shall be permitted to enter in or upon a quarantine station without permission from a quarantine officer of the Panama Canal.

SECTION XIII.

The medical officers of the Panama Canal, duly clothed with authority to act as quarantine officers at any port within the Canal Zone and the ports of the cities of Panama and Colon, Republic of Panama, when discharging the duties of quarantine officers are hereby authorized to administer oaths and take declarations in matters relating to the administration of the quarantine laws or regulations of the Panama Canal.

SECTION XIV.

The Governor of the Panama Canal is hereby authorized to prescribe, from time to time, the form of bill of health, sanitary statement, or other forms required or made necessary by these regulations, and to issue from time to time such general or special instructions, not inconsistent with these regulations, as he may deem necessary to the due enforcement of these regulations.

SECTION XV

Any person failing to observe the requirements of these regulations or of any instructions issued by the Governor of the Panama Canal in conformity with these regulations, shall be punished by a fine not exceeding five hundred dollars or by imprisonment in jail not exceeding ninety days, or both such fine and imprisonment at the discretion to the Court, in conformity with the Act of Congress authorizing the establishment of these regulations.

SECTION XVI.

All laws, orders and regulations, or parts thereof, in conflict with this order are hereby repealed.

SECTION XVII.

These regulations shall take effect thirty days from and after this date.

WOODROW WILSON.

THE WHITE HOUSE,
31 March, 1920.

[No. 3255.]

EXECUTIVE ORDER.

The areas hereinafter described respectively as Fort Randolph Reservation, France Field Reservation and Coco Solo Reservation, situated within the Canal Zone, are hereby set apart and assigned as follows: Fort Randolph and France Field to the uses and purposes of military reservations, to be under control of the Secretary of War; and Coco Solo to the uses and purposes of a naval reservation, to be under the control of the Secretary of the Navy. All the above areas, however, shall be subject to the civil jurisdiction of the Canal Zone authorities in conformity with the Panama Canal Act.

The said areas are described as follows:

FORT RANDOLPH RESERVATION.

Beginning at a 2'' g. i. pipe monument on the shore of Manzanillo Bay, on the west side of Fort Randolph branch, Panama Railroad, 22.5 feet from center line of track, geodetic coordinates of which monument are Lat. 9°-22' plus 4674.1 feet, Long. 79°-52' plus 5764.7 feet (this monument is also monument "C" on the boundary of the Naval Aviation and Submarine Base), thence South 12°-15' East paralleling the railroad a distance of 874.6 feet to a 2'' g. i. pipe monument, the geodetic coordinates of which are Lat. 9°-22' plus 3819.4 feet, Long. 79°-52' plus 5579.1 feet, thence South 77°-45' West a distance of 335.6 feet to a concrete monument whose geodetic coordinates are Lat. 9°-22' plus 3748.2 feet, Long. 79°-52' plus 5907.0 feet, thence South 12°-45' East a distance of 79.8 feet to a concrete monument the geodetic coordinates of which are Lat. 9°-22' plus 3670.4 feet, Long. 79°-52' plus 5889.4 feet, thence North 81°-37' East a distance of 336.0 feet to a 2'' g. i. pipe monument the geodetic coordinates of which are Lat. 9°-22' plus 3719.4 feet, Long. 79°-52' plus 5557.4 feet, thence again along a

line parallel to and 22.5 feet west of center line of track to a concrete monument inside a 4" C. I. pipe the geodetic coordinates of which are Lat. $9^{\circ}-21'$ plus 3547.5 feet, Long. $79^{\circ}-52'$ plus 5061.6 feet, (this monument being also monument "A" of the Naval Aviation and Submarine Base); thence South $81^{\circ}-56'$ E. a distance of 5106.8 feet to a $1\frac{1}{2}$ " g. i. pipe monument the geodetic coordinates of which are $9^{\circ}-21'$ plus 2830.6 feet, Long. $79^{\circ}-52'$ plus 5.4 feet, thence due east a distance of 6309.4 feet to Canal Zone boundary monument No. 5, the geodetic coordinates of which are Lat. $9^{\circ}-21'$ plus 2830.6 feet, Long. $79^{\circ}-50'$ plus 5709.0 feet; thence following the Canal Zone boundary line N $0^{\circ}-33'$ E to the southern shore of Largo Remo island at low water, thence following around the low water shore line of Largo Remo island in an easterly direction, thence continuing in a northerly direction along the low water shore line of Largo Remo island, Droque Island, and the two small islands to the north and adjacent to Droque island, thence continuing in a westerly direction along the low water shore line to the Canal Zone boundary line, thence continuing in the general directions west and south to include all the mainland and islands (Pena Guapa, Galeta, Palma Media, Margarita, etc.) to the point of beginning.

All bearings are true.

(All pipe monuments are painted white and stenciled in black—Mil. Res.—where the boundary lines intersect the sides of the pipe.)

FRANCE FIELD RESERVATION.

Beginning at a concrete monument inside a 4" c. i. pipe, 22.5 feet west of center line of track of the Fort Randolph branch, Panama Railroad, and approximately 4350 feet north of the point where this railroad crosses the Majagual River, the geodetic coordinates of which monument are Lat. $9^{\circ}-21'$ plus 3547.5 feet, Long. $79^{\circ}-52'$ plus 5061.6 feet, (this monument being also monument "A" of the Naval Aviation and Submarine Base described below); thence due west a distance of 520.7 feet to a 2" g. i. pipe monument on the shore of Manzanillo Bay, the geodetic coordinates of monument being Lat. $9^{\circ}-21'$ plus 3547.5 feet, Long. $79^{\circ}-52'$ plus 5582.3 feet, (this monument being also monument "B" of the Naval Aviation and Submarine Base); thence following the shore line of Manzanillo Bay in a general southerly direction to the mouth of Majagual River, thence along the north bank of said river to a $1\frac{1}{2}$ " g. i. pipe monument, the geodetic coordinates of which are Lat. $9^{\circ}-21'-00''$, Long. $79^{\circ}-52'$ plus 3810.7 feet, thence due east a distance of 3805.3 feet to a concrete monument, the geodetic coordinates of which are Lat. $9^{\circ}-21'-00''$, Long. $79^{\circ}-52'$ plus 5.4 feet, thence due north a distance of 2830.6 feet to a $1\frac{1}{2}$ " g. i. pipe monument the geodetic coordinates of which are Lat. $9^{\circ}-21'$ plus 2830.6 feet, Long. $79^{\circ}-52'$ plus 5.4 feet, thence N $81^{\circ}-56'$ W a distance of 5106.8 feet to a concrete monument inside a 4" c. i. pipe, which is the point of beginning.

All bearings are true. All pipe monuments are painted white and stenciled in black—Mil. Res.—where the boundary lines intersect the sides of the pipe.

COCO SOLO RESERVATION.

Beginning at a 2" g. i. pipe monument (marked "C" on the map) on the shore of Manzanillo Bay, on the west side of the Fort Randolph branch, Panama Railroad, and 22.5 feet from center line of track, the geodetic coordinates of which monument are Lat. $9^{\circ}-22'$ plus 4674.1 feet, Long. $79^{\circ}-52'$ plus 5764.7 feet, thence S $12^{\circ}-15'$ E paralleling the railroad, a distance of 874.6 feet to a 2" g. i. pipe monument, the geodetic coordinates of which are Lat. $9^{\circ}-22'$ plus 3819.4 feet, Long. $79^{\circ}-52'$ plus 5579.1 feet, thence S $77^{\circ}-45'$ W a distance of 335.6 feet to a concrete monument, the geodetic coordinates of which are Lat. $9^{\circ}-22'$ plus 3748.2 feet, Long. $79^{\circ}-52'$ plus 5907.0 feet, thence S $12^{\circ}-45'$ E a distance of 79.8 feet to a concrete monument the geodetic coordinates of which are Lat. $9^{\circ}-22'$ plus 3670.4 feet, Long. $79^{\circ}-52'$ plus 5889.4 feet, thence N $81^{\circ}-37'$ E a distance of 336.0 feet to a 2" g. i. pipe monument the geodetic coordinates of which are Lat. $9^{\circ}-22'$ plus 3719.4 feet, Long. $79^{\circ}-52'$ plus 5557.4 feet, thence again along a line parallel to and 22.5 feet west of center line of track to a concrete monument inside of a 4" c. i. pipe, the geodetic coordinates of which are $9^{\circ}-21'$ plus 3547.5 feet, Long. $79^{\circ}-52'$ plus 5061.6 feet, (this monument marked "A" on the map), thence due west a distance of 520.7 feet to a 2" g. i. pipe monument on the shore of Manzanillo Bay, the geodetic coordinates of which monument are Lat. $9^{\circ}-21'$ plus 3547.5 feet, Long. $79^{\circ}-52'$ plus 5582.3 feet, (this monument marked "B" on the map).

The part of the boundary thus far described is common with the boundary of the Fort Randolph Military Reservation, on the east, and France Field on the south.

Thence following the shore line of Manzanillo Bay in a northerly and easterly direction to the point of beginning.

All bearings true. All pipe monuments are painted white and stenciled in black—Mil. Res.—where the boundary lines intersect the sides of the pipe.

In addition to the above, the Secretary of War shall have control of all lands and water for a distance of one hundred yards out to sea from the high water line on all shores of Fort Randolph and France Field Reservations, and the Secretary of the Navy shall have control of all lands and water for a distance of one hundred yards out to sea from the high water line on all shores of Coco Solo Reservation.

The transfer of the Fort Randolph and France Field Reservations is made subject to the continued right of the Supply Department of the Panama Canal to use areas not contiguous to barracks or quarters for pasturage of cattle for the supply of beef to the Canal Zone; the pasturage areas, however, to be available for use by the troops when required for military maneuvers or for target practice.

WOODROW WILSON.

THE WHITE HOUSE,
9 April, 1920.

[No. 3257.]

EXECUTIVE ORDER.

By direction of the President it is ordered that Senor Don Manuel Walls y Merino shall be allowed a lump sum of Seven Hundred Fifty Dollars (\$750) to cover his salary and traveling expenses after completion on the Isthmus of his services as Umpire of the Joint Land Commission in lieu of the compensation and return traveling allowances authorized in the Executive order dated March 20, 1917.

NEWTON D. BAKER,
Secretary of War.

WASHINGTON, D. C.,
May 1, 1920.

PROCLAMATION.

OPENING OF THE PANAMA CANAL.

WHEREAS, Section 4 of the Act of Congress entitled "An Act To Provide for the opening, maintenance, protection and operation of the Panama Canal, and the sanitation and government of the Canal Zone," approved August 24, 1912, (37 Stat. L. 561) and known as the Panama Canal Act, provides that upon the completion of the Panama Canal the President shall cause it to be officially and formally opened for use and operation; and

WHEREAS, the Canal is completed, and is open for commerce;

NOW, THEREFORE, I, WOODROW WILSON, President of the United States of America, acting under the authority of the Panama Canal Act, do hereby declare and proclaim the official and formal opening of the Panama Canal for use and operation in conformity with the laws of the United States.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done in the District of Columbia, this 12th day of July, in the year of our Lord One Thousand Nine Hundred and Twenty, and of the Independence of the United States of America, the One Hundred and Forty-fifth.

[SEAL]

WOODROW WILSON.

By the President:
NORMAN H. DAVIS,
Acting Secretary of State.

[No. 1570.]

EXECUTIVE ORDER.

PAITILLA POINT MILITARY RESERVATION.

The area hereinafter described as Paitilla Point Military Reservation, formerly situated within the Republic of Panama, but acquired by the United States Government and now a part of the Canal Zone, is hereby set apart as a military reservation under the control of the Secretary of War, the said reservation, however, to remain subject to the civil jurisdiction of the Canal Zone authorities in conformity with the Panama Canal Act.

The said area is described as follows:

PAITILLA POINT MILITARY RESERVATION.

Starting at a triangulation station marked "Paitilla 1914" on the map (Panama Canal Drawing No. X-6053-1) the geodetic coordinates of which are Lat. $8^{\circ} 58'$ plus 3,045.82 feet and Long. $79^{\circ} 30'$ plus 5,847.92 feet, go on an azimuth of $180^{\circ} 00'$ for a distance of 1,399.24 feet to a concrete monument, marked "A" on the map, which is the point of beginning on the boundary of the reservation; thence on a line the azimuth of which is $270^{\circ} 00'$ for a distance of 1,146.95 feet to a concrete monument marked "B" on the map, which monument is on the extreme high-water line on the shore of the Bay of Panama; thence along the extreme high-water line, in a general southwesterly direction, for a distance of 6,000 feet more or less to a concrete monument marked "C" on the map, which monument is on the extreme high-water line; thence on a line the azimuth of which is $123^{\circ} 43'$ for a distance of 67.3 feet to a concrete monument marked "D" on the map, which monument is on the extreme high water line. The last-mentioned course between "C" and "D" cuts off the extreme end of Paitilla Point and coincides with the old Panama City boundary. From "D" follow the extreme high-water line in a northerly direction along the east bank of the estuary of the Rio Matasnillo for a distance of 4,000 feet more or less to a concrete monument marked "E" on the map; thence on a line the azimuth of which is $270^{\circ} 00'$ for a distance of 1,088.76 feet to a concrete monument marked "A" on the map, which is the point of beginning.

All bearings are true.

In addition to the above, the Secretary of War shall have control of all land on the eastern side of above described area between extreme high-water line and low-water line within the confines of the prolongation of boundary lines E-B and D-C; also all land on the western side of above described area between extreme high water line and low-water line, but in no case further than the center line of the Rio Matasnillo, between the confines of the prolongation of boundary lines B-E and C-D.

WOODROW WILSON.

THE WHITE HOUSE,
1 September, 1920.

[No. 3322.]

EXECUTIVE ORDER.

WHEREAS, Under the provisions of Section 17 of the Act approved June 5, 1920, entitled "An Act To Provide for the promotion and maintenance of the American merchant marine, etc.," the Shipping Board "is authorized and directed to take over on January 1, 1921, the possession and control of, and to maintain and develop, all docks, piers, warehouses, wharves and terminal equipment and facilities, including all leasehold easements, rights of way, riparian rights and other rights, estates and interests therein or appurtenant thereto, acquired by the President by or under the Act entitled 'An Act making appropriations to supply urgent deficiencies in appropriations for the fiscal year ending June 30, 1918, etc.'"; and

WHEREAS, By a further provision of said Section 17, "the President may at any time he deems it necessary, by order setting out the need therefor and fixing the period of such need, permit or transfer the possession and control of any part of the property taken over by or transferred to the Shipping Board under this section to the War Department or the Navy Department for their needs"; and

WHEREAS, The piers known as the Hoboken piers, formerly the property of the North German Lloyd and Hamburg American Steamship Companies and of the

Hoboken Shore Railroad, were acquired by the President under the Act referred to in paragraph 1 of Section 17 of the Act of June 5, 1920, hereinbefore recited, and are therefore subject to the provisions of said Section 17; and

WHEREAS, The War Department has heretofore leased pier No. 1, with bulkhead and yard space opposite, of said property to the Panama Railroad Steamship Line for a period of five years, which said Panama Railroad Steamship Line is the property of the Government of the United States, performing an indispensable service in connection with the maintenance and operation of the Panama Canal, and incidentally furthering the commercial service between the United States and certain Caribbean, Central and South American ports, and is using said pier intensively and efficiently; and

WHEREAS, Piers 4, 5, 6, and 11, being parts of said property, are necessary to be retained in the possession and control of the War Department for use in connection with the overseas transport service now carrying men and supplies to and from Antwerp for the American Army of Occupation at Coblenz; now

THEREFORE, I do hereby determine that it is necessary that the War Department retain of such property piers 1, 4, 5, 6, and 11, together with the bulkhead opposite the slip between piers 3 and 4, and opposite piers 1, 4, 5, and 6; also the second floor of the bulkhead opposite the slip between piers 3 and 4 and opposite pier 4; also the offices on the third floor of the bulkhead opposite piers 1, 2, and 3; and the yard space opposite piers 1, 4, 5, and 6; and do order and direct that the said War Department do retain all of such property so described, and fix the period of retention as to pier 1, with bulkhead and yard space opposite, as the period of the existing lease of five years made between the War Department and the Panama Railroad Steamship Line, and as the period of retention of the other property herein directed and ordered to be retained a period of two years, unless in the opinion of the President the need of the War Department therefor, or for any part thereof, shall in the meantime cease, in which case, by an order subsequent hereto, the President declaring the cessation of such need shall cause possession and control of such property or part thereof to revert to the Shipping Board.

WOODROW WILSON.

THE WHITE HOUSE,
2 October, 1920.

[No. 3332.]



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